State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Waste Management

James B. Hunt, Jr., Governor
Wayne McDevitt, Secretary
William L. Meyer, Director

DEHNR

October 20, 1997

Mr. Patrick Barnes
BFA ENVIRONMENTAL, INC
3655 Maguire Blvd., Suite 150
Orlando, FL 32803

Dear Patrick:

Enclosed are comments from the Division of Waste Management on the Draft PCB Landfill Site Investigation Report, as well as copies of additional information and studies done for or by the division. Comments on specific sections are listed with reference to the individual section numbers from the report. I have also attached the following documents:

1) Analytical data roll-up, QA Evaluation: The division contracted Mr. James A. Ploscyca of ENVIRONMENTAL EFFICIENCY to go through the laboratory data and compile into tabular form the information from the lab reports. The results are now all listed by media and can be compared quickly and easily. Mr. Ploscyca has also completed a Quality Assurance Laboratory Data Evaluation on the dioxin data.

2) Methane Monitoring: Last spring and again this fall, division personnel grided off the surface of the landfill, plugged the top eight inches of soil cover and checked for methane gas. The results of this testing are presented in tabular form / report.

3) Weather station: A weather monitoring station has been installed at the landfill, and includes water level monitoring in the north borehole in the landfill. We anticipate hooking up the south borehole on October 20. Temperature, wind direction and barometric pressure are likewise monitored. The report includes a description of the system, and data from the first two weeks of monitoring.

Please include these comments in the final report.

Sincerely,

Michael A. Kelly, CHMM, REM
Deputy Director

COPY: Dr. Joel Hirschhorn, Warren County Working Group

U.S. EPA REGION IV

SDMS

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V. 2-040506

DIVISION OF WASTE MANAGEMENT
DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES

COMMENTS ON THE DRAFT PCB LANDFILL SITE INVESTIGATION REPORT

October 20, 1997

SECTION 2.0

2.3. LANDFILL DESIGN: It should be noted that a leachate collection system (LCS) was installed in the landfill. While it is true that the original set of construction drawings for the landfill showed perforated piping as a component of the LCS, the Environmental Impact Statement (EIS), with the final design plan, was publicly noticed and approved by the Environmental Protection Agency (EPA). This final plan did not show a perforated pipe in the system. The leachate system has not necessarily operated properly, it is possible that the sand component of the LCS is functioning properly and as designed, however the lack of flow in the system is most likely due to improperly sized pumps which do not operate on a continuous basis, the low moisture content of the landfill contents and the relatively low permeabilities of the landfill soils themselves. Also, the comment that analysis of the water in the landfill compared to seasonal rainfall indicates water is leaking into and out of the landfill is only one possible explanation of the water level fluctuations in the landfill.

2.4 REGULATORY COMPLIANCE: The division questions how analysis of hydroraphs for water in and outside the landfill "*found that there had been significant violations of federal regulatory requirements with regard to monitoring and landfill design, construction, and operation*". There were no significant violations found which supports any *"release of hazardous substances that happened because of design or construction deficiencies, or because routine monitoring had not detected the releases, or both"*. EPA makes no comment as to any real or imagined release, nor made any comment on construction deficiencies.

SECTION 4.0

4.2 LANDFILL FACILITY: All PCB analysis done on soils taken from the landfill, and prior to the material being placed in the landfill, have shown various levels of PCBs. This is consistent with what one would expect from oil hap-hazardly dumped along miles of roadway.

The dioxin data can be considered inconclusive due to the nature of and low detection levels of dioxin compounds found. Analysis of the dioxin data through quality assurance evaluation shows that dioxin was found in many different places, including OCDD in every groundwater sample collected at the site, as well as, in many of the field and laboratory blank samples. The presence of dioxin in so many of the "blanks" indicates a probable contamination

problem in the laboratory. Additional sampling should be done, particularly in M W-5D and M W-1A, where dioxins were found in higher concentrations (noted in Section 4.3).

4.5 OFF SITE SOILS AND SEDIMENTS: It is significant to note that a larger number of samples were taken off site in the soil and sediment under the belief that if PCB's had escaped (or were escaping) from the landfill through air emissions, they would be detected in the soils surrounding the landfill where the heavy molecules of PCB (being carried by dust particles) would fall out. No PCB's were detected in any of the samples, with the exception of a split sample from the Leachate Collection Pond EPA analyzed in which they found .1 ppm.

4.6 AIR TESTING FOR PCB's: As noted in the report, there were three separate sampling events that occurred from February through August 1997. One of the sampling events utilized low flow Gil-air pumps over a period of several days and the other two events utilized high volume air monitoring systems during two different 24 hour periods. On the recommendations of the Science Advisors, an attempt was made to pull at least 1,500 liters of air through the Gil-air pumps, however, the average amounts were approximately 1,200 liters, and it was on one of these samples that PCB's were found in concentrations of approximately 3,000 ng/cubic meter. The subsequent high volume sampling events, where over 150,000 liters of air were pulled through the filters, no PCB's were detected. Three of the high volume samplers were placed in approximately the same area as the one sampling pump that showed "hot" during the February testing. The report concludes that releases would occur in locations where there were breaches in the surface containment system, such as holes in the plastic liner or cap. While this conclusion is somewhat valid, it does ignore the other observations and physical realities of the landfill.

There is no evidence of a catastrophic failure of the cap. In February, there were no signs of cracks, stressed or dead patches of vegetation or gas detected in the numerous locations checked by the state. Furthermore, methane testing done again this fall likewise did not detect any gas coming from the landfill through the cap (see methane reports, conclusions, attached). The conclusion that the liner has failed thus allowing PCB's to escape deals only with the plastic liner and ignores the presence of five feet of compacted, saturated clay, which covers the landfill as the "cap". Methane gases do not readily migrate through saturated soils, rather they choose the path of least resistance, which would be a nonsaturated zone. For example, in municipal solid waste landfill monitoring, gas is never detected in the saturated zone. Further, the transport and fate mechanisms of the pollutant in question, PCB's, have been totally ignored in the analysis. PCB's are large, heavy molecules which have a high affinity for sorption onto clays. It is therefore questionable how PCB's are becoming unbound from the clays and silts in the landfill, entering the gas phase at relatively low temperatures and then flowing, uncollected, through over five feet of saturated, compacted, clayey material.

If in fact the PCB's detected in the one "hot" air sample did indeed come from the landfill as a result of a belch or puff as described in the report, there is no explanation why none were detected in the vent pipe or on the air pump sampler located beside the one that showed positive,

as it was downwind from the positive one. If the landfill belched or a sudden puff occurred, at least some of that gas should come through the vent pipe which was designed for the release of such gases. It is not plausible to believe that such a high dose of PCB's would occur in only one spot and none even be detected in the other samplers so close to the hot spot, particularly in the air sample being pulled from inside the landfill through the vent (directly inside and before the carbon filter). The high concentration found in the one sample was most likely due to lab contamination.

As stated in the report, there is no way in which we can tell what releases through the air may have occurred in the early 1980's. The EPA study done by Robert G. Lewis and Barry E. Martin, after closure of the landfill found detectable PCB's in 4 of 39 ambient air samples, and through two dispersion models showed that any concentrations downwind would be below the detection capability of any known sampling equipment. The conclusions indicated that *"emissions of PCB.... were found to be negligible."* Subsequent testing in 1983, as suggested by that report, likewise did not show any evidence of air emissions, and therefore no continuous monitoring was done by the state.

4.7 LANDFILL INTEGRITY: There is absolutely no evidence that the *"landfill has lost its integrity and its ability to safeguard against future releases of PCB's and Dioxins."* This is an opinion of the Science Advisors and not supported by facts.

4.7.1 Top Liner: This section is devoted entirely to discussion of the 10 mil plastic liner over the clay cap. No mention is made of the clay cap. The plastic liner was certainly not in the best shape, however, it should be noted that based on the evaluation by S&ME it was in "fair condition". Pinholes were found in the sample taken from the north bore hole, but no pinholes were in the sample from the south bore hole. Only one spot appeared to have not been welded, although it was obvious that several places on the seam had been breached by root vegetation. The seams in some spots have deteriorated over time, probably due to the loss of plasticizer in the parent material, or deterioration of the chemical composition of the original solvent used in 1982. By reviewing the lab test results on the PVC liner, it appears to be in adequate shape, and aging as expected. The seams did show shear strength and low peel strength, while the other properties were consistent with aging due to the loss of plasticizer, particularly the increase in tensile strength and a decrease in the elongation at break strength.

The report states *"given that only two locations were inspected and both were in poor condition, it is likely that a significant portion of the synthetic cap has lost all practical integrity"*. S&ME concluded that the cap system *"appears to be providing satisfactory performance"*. The report further ignores the presence of the compacted clay barrier layer and vegetative cover portion of the system. This almost five foot thick layer has permeabilities on the order of 10 -8 cm/sec. S&ME said the surface of the clay appeared to be in good condition and that the permeability tests are indicative of well compacted clays. They also state that the perms are lower than typically specified (10 -7 cm/sec). The cap has a healthy stand of vegetation which would yield high amounts of evapotranspiration, and is graded to shed water.

Observations of the landfill and the results of the cap inspection, at those two points, do not point to a cap system that has lost all practical integrity.

4.7.2 WATER IN THE LANDFILL: When analyzing the hydrograph data, one must also consider several other influences on the recorded levels. Primary is the influence of barometric pressure as well as the type and placement of the pipes from which the water level data is taken. The sensitivity of the recording instrument is also a factor. Low barometric pressure will cause an increase in water levels and high barometric pressure will cause a "decrease" in the water level. Barometric pressures were obtained for 1995-1997 for RDU and plotted versus the water levels in the leachate pipe and the riser. In all cases, the water level moves with the barometric pressure. This is not to imply that water could not be entering the landfill, rather how and how much must be further evaluated. The state has already recorded a 13 inch change in water level in less than 48 hours. The spikes in the rainfall and the months chosen should also be carefully examined. Infiltration may not be due to movement through the cap, but through other entries like the leachate collection pipe, animal burrows, or other "point" penetrations of the liner. Data collected from lysimeters beneath a cap system at the city of High Point, NC, which have been monitored for over one year, do not show any infiltration during the warm months, regardless of the amount of rainfall. Runoff and evapotranspiration exceed rainfall. Only during the dormant winter months, December-February, are small amounts of infiltration registered through a two foot vegetative layer.

The report states *"the increased stress on the bottom liner system coupled with several other complicating factors has apparently resulted in a breach of the bottom liner system".* It is assumed that the "stress" is from the water. There is, however, no evidence of a catastrophic breach of the bottom liner system. The report fails to acknowledge that the bottom liner system includes a leak detection zone which is monitored monthly and has never detected a leak, and that there is a five foot clay liner system with 10 -8 cm/sec permeability on top of the PVC liner.

The analysis on the "delayed rise" is incomplete. It neglects evapotranspiration, additional rainfall, runoff, etc. In addition it neglects the two feet of clay under the PVC liner, the one foot of bridging material, and the additional 12-14 feet of unsaturated landfill soils, that water would have to traverse to reach the phreatic surface. An analysis of the moisture contents of the landfill soil samples gives no indication of a zone of saturation, wetting front, or other indication that there is a change in moisture content in the landfill upper zone. Most of the moisture contents are less than the field capacity of the soils.

Leakage rate: Assuming an effective porosity (specific yield) should be confirmed by analyzing the geotechnical test results on the landfill contents. A more meaningful, and representative number could be generated. The approximate ten inch fluctuation over a six month period can easily be attributed to changes in barometric pressure. As mentioned previously, the state has measured a 13 inch fluctuation in less than 48 hours, during a period of no rain, and a very dry cap.

It should also be noted in the report that the rainfall data for the Arcola station is as follows:

1992- 47.95 inches	1993- 43.80 inches
1994- 40.28 inches	1995- 56.85 inches
1996- 60.58 inches	1997- 20.86 inches (6 months)

4.7.3 BOTTOM LINER: Pictures 1, 2 and 3 actually show vandalism done to the bottom liner during construction. The vandalism is to the plastic liner only, and was repaired. The clay bottom liner was not harmed. Pictures 8 and 9 show water trapped in the landfill during the final stages of remedial activities. Picture 10 actually shows pieces of filter fabric washed by the torrential rains, and is not a picture of the PVC liner. There is no evidence to indicate that the bottom liner is not intact. Even if there are potential problems with the PVC liner, as discussed with the top liner, the report neglects the existence and contribution of five feet of compacted clay, and the fact that the leak detection zone under the bottom liner has never shown the presence of any water.

SECTION 5.0 CONCLUSIONS:

It was a forgone conclusion that the PCB levels vary in the landfill. However, there was not one piece of evidence for PCB contamination outside the landfill. It should be noted that low levels of PCB's were found in the landfill leachate. No PCB's were found in any samples, groundwater, soil, or sediment outside of the landfill, with the exception of the one sample in the pond area where EPA found .1 ppm PCB. The *"reliable data"* being used by the Science Advisors indicating *"some limited impact of the landfill on subsurface materials immediately outside the landfill"* is the presence of dioxins in two monitoring wells. Even the presence of these various compounds do not correlate, and after evaluation of the Quality Assurance of the dioxin data, the results are highly suspect as dioxin was also found in the lab and field blanks. It would certainly be appropriate to re-do some of the dioxin testing, particularly in monitoring wells 5-d and 1-a. Due to the low solubilities of dioxins in water, it does not seem feasible that the landfill would be contributing to dioxin found in monitoring wells 5-d and 1-a without also showing some PCB's, as PCB's were found in measurable quantities in the leachate from the landfill. Thus if one compound were leaking out, why not the other?

SECTION 6.0: RECOMMENDATIONS

The variations of PCB concentrations in the landfill probably have no effect on the detoxification process, as most processes, including the BCD, are often utilized for sites with greater than 10,000 ppm of PCB's, which is more than 10 times any concentration found in the landfill. Probably of greater concern will be the wet zone at the bottom of the landfill as the process will be affected by sudden volumes of water which could cause an immediate temperature drop in the process. This should be studied in the Phase II report.

October 6, 1997

To: Bill Meyer, Director, Division of Waste Management
Mike Kelley, Deputy Director, Division of Waste Management

From: Ed Mussler, P.E., Solid Waste Section, Division of Waste Management

Re: Monitoring System at the PCB Landfill, Warren County, North Carolina

Gentlemen,

This memorandum provides information on the monitoring equipment which has been installed at the PCB landfill in Warren County. The system consists of a battery powered data logger (computer), and instruments which monitor and record rainfall, ambient temperature, ambient pressure, and water levels within the landfill. Water levels are being monitored in the two new boreholes which were put in the landfill in February, 1997.

The instruments take measurements once per hour, and the results are stored in the data logger (rainfall is cumulative and the hourly total is stored). Periodically, division staff go to the landfill and download the stored data from the data logger into a laptop computer. Reports can be generated and the data is available in comma delimited ASCII files for import into most common data base and spreadsheet programs. Currently the data is downloaded every 7-10 days, but the battery is expected to last for at least 30 days in the winter, more in the summer.

The instruments were installed and the system debugged on September 23 and 24, 1997. Hourly readings have been recorded since two PM on September 24. Data was last retrieved October 3. One water level instrument was installed in the south borehole. Additional cable is required to install the second instrument in the north borehole. The cable has been ordered and it is expected that it will be installed before the 15th of October.

A summary of the equipment installed at the landfill may be found on the attached specifications sheet. If there are any further questions, please do not hesitate to contact me.

PCB Landfill Monitoring Equipment
Specification Sheet

Data Logger	Met One Instruments, Grants Pass, Oregon. Model 457. An enhanced Campbell Scientific CR10 Data Logger.
VWP Interface	Campbell Scientific digital to analog interface. Used to communicate with the VS Piezometers.
Battery	Lowes, 12 volt, 135 amp-hour, rechargeable lawn tractor battery.
VS Piezometer	Slope Indicator, Vibrating wire strip piezometer. Used to measure pressure, thus water level elevations and changes in the boreholes. Very accurate, +/- 0.001 feet. The instrument is used to measure water levels in the landfill. It was zeroed with measurements taken manually with an electronic water level indicator. The instrument converts water pressure to a tensional load on a fixed steel strip (similar to a tuning fork). Tension increases linearly with pressure. A magnetic coil excites the strip, which vibrates at a known frequency. The vibration excites the strip which vibrates and generates voltage pulses. These pulses are counted, calibrated, and converted to an elevation of water for the output.
Software	Custom written. Meteorological portion by Met One, VSP by Slope Indicator, debugged by division consultant.
Pressure Sensor	Met One, Model 090D- solid state barometer. Provides absolute (site specific) pressure. Monitors and calibrated for 26-32" of Mercury (Hg) pressure. Temperature rated for -18 to 50 degrees C (-0.4-122 degrees F). Accurate to +/-0.04" of Hg.
Rain Gauge	Met One, tipping bucket. Model 370, 8". Measures 0.01" of rain. Mercury switch. Accurate to +/- 1% at 1"-3" of rain per hour, at 70 F.
Temperature	Campbell Scientific. Model 107 with a model 41301 radiation shield. Mounted on and 8 foot PVC pole. Range -35-50 degrees C. Sensitivity of <+/- 0.4 C within -24-48 degrees C (-11.2-118.4 degrees F).

October 16, 1997

To: Bill Meyer, Director, Division of Waste Management
Mike Kelley, Deputy Director, Division of Waste Management

From: Ed Mussler, P.E., Solid Waste Section, Division of Waste Management

Re: Preliminary Data From the Monitoring System at the PCB Landfill, Warren County, North Carolina. September 24- October 9, 1997.

Gentlemen,

Attached you will find several examples of data collected from the monitoring equipment recently installed at the landfill, as well as similar results of historical data collected from the landfill vent. For reference the attachments are labeled as follows:

Attachment 1 Example of data logger report- Data from September 25-29, 1997.
Attachment 2 Microsoft Excel spreadsheet summary of data logger data, September 24- October 9, 1997. Note summary on page 1.
Attachment 3 Graph of Hourly barometric pressure and water levels in south borehole, September 24- October 9, 1997.
Attachment 4 Microsoft Excel spreadsheet of water elevations measured in the landfill air vent monitoring point. December 1994 through September 1997. This spread sheet also contains the monthly and yearly rainfall data for the Arcola station in Warren county. The average barometric pressure for the day, as recorded at RDU and adjusted to sea level is also included.
Attachment 5 Air Vent water levels versus RDU(sea level adjusted) barometric pressure graph. Monthly for 12/94 through 9/97.

Attachment 3 clearly shows that the water level measured in the south borehole fluctuates in direct correlation with the atmospheric (barometric) pressure. During the period of record, the water level measured in the borehole fluctuated by 13. 2 inches and the barometric pressure varied by 0.89 inches of mercury, often showing response hourly. It is important to note that the change registered by the VSP is in tenths of a foot (~1.2 inches) The highest reading came during a spell when the barometric pressure was the lowest, and the lowest water level was recorded during times when the atmospheric pressure was the highest.

When atmospheric pressure is high it "pushes down" on the water surface, thus lowering the recorded elevation. When the pressure is "low" there is less force on the water so it "rises" accordingly. For reference, 12" of water column is equal to 0.883 inches of mercury (Hg). During this time period only 0.85 inches of rain fell, hardly enough to generate the water level swing measured, even if it had all entered the landfill, a highly unlikely assumption.

Attachment 5 also clearly shows that there is a relationship between the barometric pressure and the level of the water that is measured in the landfill air vent. Attachment 4 is a record of the data collected by the division and used to generate the graph. Attachment 4 provides a statistical

analysis of the air vent data. The data is summarized for the period of record (12/94-9-97) as well as for each year of record (1995, 1996, 1997 to date). The data clearly shows that the fluctuation in the measured air vent water level was 9" in 1995 and 13.32" to date in 1997, less than or equal to measurements of fluctuation collected in ten days with the monitoring equipment.

The year of 1996 showed a total fluctuation of measured water level in the air vent of 21.6 inches. HOWEVER it must be noted that the spread in the barometric pressure was almost one inch of Hg (0.98") versus a spread of about 0.5. inches of Hg in 1995 and 1997, to date. It is also important to note that the yearly rainfall, reported by the Arcola station, was 40.28 " in 1994, 56.85" in 1995 and 60.58" in 1996, well above the NC average of approximately 45 inches per year.

In an effort to "even out" the air vent information, the data was analyzed for an average (mean) , medium, as well as maximum and minimum recorded value for the time period of concern. The yearly averages were then averaged, and indicated a spread of 9.378 inches, well within the fluctuation recorded in just 10 days in the south borehole. If one compares the borehole data (means), there is an indication that water is entering the landfill. This is consistent with the evaluations of both Barnes and Richardson. The average water level, as measured in the vent, appears to be slowly increasing. The data for the summer of 1997 records that the water level in the landfill maybe increasing. However, the rainfall for the summer of 1997 was well below normal (August 1997 was the second LOWEST recorded rainfall amount, at RDU, in the last 100 years).If the landfill were leaking any measurable amount, then why are the measured water levels increasing?

The data clearly needs more interpretation. It is clear that the measured water levels in the landfill fluctuate with the atmospheric pressure. Historical data from the air vent, appears to show that the water level in the landfill is slowly increasing. In my opinion, there is no indication that water is leaving the landfill (as evidenced by an increase in the measured water levels during a time of minimum rainfall).

In analyzing the data from the landfill, one must be cognizant of the relationship between the measured water level and the barometric pressure. Analysis to date does not include the behavior of the landfill system, including the contribution of any internal gas pressure in the landfill.

In summary, the measured level of the water in the landfill rises and falls in good correlation with the ambient barometric pressure. The hypothesis, as presented by Barnes and Hirschorn that significant amounts of water are entering the landfill and leaving the landfill is incorrect. The bottom liner appears to be intact. Observed increases in the water level in the landfill can be related to barometric pressure swings, and possible, minimal infiltration of water into the landfill.

Station: STATE OF NC 94-4317 RALEIGH, NC 09/25/97

ATTACHMENT 1

1/5

Chan:	AmbT	Rain	BP	Batt	H2O#1	H2O#2
Unit:	DegF	inch	inHg	VDC	ft	ft
00:00	55.68	0.0000	29.6	10.97	13.87	337.1
01:00	55.79	0.0000	29.58	10.97	13.92	337.1
02:00	55.63	.01	29.55	10.97	13.92	337.1
03:00	55.54	.03	29.53	10.96	13.96	337.1
04:00	55.51	0.0000	29.5	10.95	13.98	337.2
05:00	55.49	.05	29.48	10.93	14.02	337.2
06:00	55.27	0.0000	29.47	10.94	14	337.2
07:00	55.1	.01	29.47	10.93	14.02	337.2
08:00	55.07	.02	29.46	10.93	14.01	337.2
09:00	55.35	0.0000	29.46	10.93	14.02	337.2
10:00	55.94	0.0000	29.46	10.92	14.03	337.2
11:00	56.57	0.0000	29.46	10.9	14.05	337.2
12:00	57.25	0.0000	29.44	10.91	14.01	337.2
13:00	58.7	0.0000	29.43	10.91	14.05	337.2
14:00	60.49	0.0000	29.43	10.94	14.07	337.2
15:00	61.93	0.0000	29.4	10.95	14.06	337.2
16:00	63.63	0.0000	29.38	10.9	14.12	337.2
17:00	64.49	0.0000	29.37	10.89	14.12	337.2
18:00	64.15	0.0000	29.37	10.94	14.12	337.2
19:00	63.32	0.0000	29.37	10.93	14.14	337.3
20:00	62.1	0.0000	29.36	10.87	14.13	337.3
21:00	59.03	0.0000	29.36	10.85	14.13	337.3
22:00	58.4	0.0000	29.37	10.87	14.11	337.2
23:00	59.45	0.0000	29.38	10.83	14.06	337.2
Total	1399.88	.12	706.679	262.09	336.92	8092.70
SAvg	58.3283	.005	29.445	10.9204	14.0383	337.195
VAvg	58.3271	.005	29.445	10.9204	14.0383	337.195

100% Data Recovery

Station: STATE OF NC 94-4317 RALEIGH, NC 09/26/97 A-1

Chan:	AmbT	Rain	BP	Batt	H2O#1	H2O#2
Unit:	DegF	inch	inHg	VDC	ft	ft
00:00	60.66	0.0000	29.39	10.83	14.09	337.2
01:00	60.9	0.0000	29.4	10.82	14.08	337.2
02:00	60.11	0.0000	29.41	10.82	14.09	337.2
03:00	58.23	0.0000	29.41	10.83	14.08	337.2
04:00	56.09	0.0000	29.41	10.79	14.08	337.2
05:00	52.57	0.0000	29.41	10.79	14.08	337.2
06:00	50.85	0.0000	29.42	10.78	14.05	337.1
07:00	50.41	0.0000	29.45	10.76	14.03	337.1
08:00	49.39	0.0000	29.46	10.76	14	337.1
09:00	54.38	0.0000	29.49	10.75	13.96	337.1
10:00	61.44	0.0000	29.54	10.78	13.91	337
11:00	64.92	0.0000	29.58	10.8	13.87	337
12:00	70.7	0.0000	29.61	10.78	13.84	336.9
13:00	72.3	0.0000	29.62	10.84	13.83	336.9
14:00	74.9	0.0000	29.62	10.8	13.84	336.9
15:00	76.7	0.0000	29.62	10.86	13.84	336.9
16:00	76.9	0.0000	29.62	10.82	13.84	336.9
17:00	73.8	0.0000	29.62	10.85	13.8	336.9
18:00	71.6	0.0000	29.6	10.79	13.86	337
19:00	68.72	0.0000	29.61	10.82	13.84	337
20:00	65.69	0.0000	29.62	10.74	13.84	337
21:00	62.83	0.0000	29.62	10.78	13.82	336.9
22:00	61.5	0.0000	29.65	10.71	13.8	336.9
23:00	60.21	0.0000	29.66	10.74	13.8	336.9
Total	1515.8	0	708.839	259.04	334.27	8088.7
SAvg	63.1583	0	29.535	10.7933	13.9279	337.029
VAvg	63.1563	0	29.535	10.7933	13.9279	337.029

2/5

100% Data Recovery

Station: STATE OF NC 94-4317 RALEIGH, NC 09/27/97 A-1

Chan: / Unit:	AmbT DegF	Rain inch	BP inHg	Batt VDC	H2O#1 ft	H2O#2 ft
00:00	58.78	0.0000	29.64	10.68	13.83	336.9
01:00	58.05	0.0000	29.63	10.71	13.83	337
02:00	58.75	0.0000	29.63	10.67	13.82	337
03:00	58.36	0.0000	29.63	10.66	13.82	337
04:00	58.44	0.0000	29.63	10.66	13.78	337
05:00	58.01	0.0000	29.62	10.64	13.83	337
06:00	57.25	0.0000	29.62	10.66	13.83	337
07:00	56.67	0.0000	29.63	10.63	13.87	337
08:00	55.35	0.0000	29.64	10.64	13.81	337
09:00	56.22	0.0000	29.65	10.63	13.81	337
10:00	61.43	0.0000	29.66	10.62	13.77	336.9
11:00	66.07	0.0000	29.7	10.63	13.74	336.9
12:00	71.2	0.0000	29.72	10.69	13.67	336.9
13:00	73.2	0.0000	29.72	10.71	13.74	336.9
14:00	73.3	0.0000	29.7	10.71	13.76	336.9
15:00	73.4	0.0000	29.68	10.71	13.78	336.9
16:00	73.3	0.0000	29.66	10.69	13.8	337
17:00	72.8	0.0000	29.65	10.69	13.82	337
18:00	71	0.0000	29.63	10.62	13.84	337
19:00	69.17	0.0000	29.62	10.65	13.84	337
20:00	67.95	0.0000	29.62	10.58	13.85	337
21:00	66.99	0.0000	29.6	10.61	13.86	337.1
22:00	64.53	0.0000	29.59	10.55	13.88	337.1
23:00	64.7	0.0000	29.58	10.58	13.89	337.1
Total	1544.92	0	711.45	255.62	331.47	8087.6
SAvg	64.3716	0	29.6437	10.6508	13.8112	336.983
VAvg	64.3699	0	29.6437	10.6508	13.8112	336.983

100% Data Recovery

Station: STATE OF NC 94-4317 RALEIGH, NC 09/28/97

A-1

Chan:	AmbT	Rain	BP	Batt	H2O#1	H2O#2
Unit:	DegF	inch	inHg	VDC	ft	ft
00:00	65.88	0.0000	29.57	10.53	13.91	337.1
01:00	65.16	0.0000	29.54	10.52	13.94	337.1
02:00	65.13	0.0000	29.53	10.55	13.94	337.2
03:00	65.25	0.0000	29.51	10.55	13.98	337.2
04:00	64.73	.03	29.48	10.53	14.02	337.2
05:00	64.12	0.0000	29.46	10.53	14.03	337.3
06:00	64.54	0.0000	29.45	10.48	14.03	337.3
07:00	64.76	.02	29.45	10.47	14.05	337.3
08:00	65.03	.03	29.43	10.51	14.07	337.3
09:00	65.68	0.0000	29.41	10.45	14.08	337.3
10:00	66.52	.01	29.4	10.45	14.09	337.4
11:00	67.24	.02	29.4	10.49	14.11	337.4
12:00	68.21	.02	29.38	10.43	14.12	337.4
13:00	69.61	.01	29.36	10.43	14.15	337.4
14:00	70.7	.01	29.34	10.47	14.17	337.4
15:00	71.3	.02	29.31	10.42	14.21	337.5
16:00	71.5	.01	29.29	10.47	14.23	337.5
17:00	71.1	0.0000	29.28	10.4	14.24	337.5
18:00	70.2	.01	29.27	10.44	14.25	337.6
19:00	68.04	0.0000	29.26	10.42	14.26	337.6
20:00	65.92	.02	29.26	10.36	14.24	337.6
21:00	65.09	0.0000	29.27	10.34	14.24	337.6
22:00	64.62	0.0000	29.26	10.37	14.26	337.6
23:00	63.98	0.0000	29.25	10.32	14.25	337.6
Total	1604.31	.21	705.160	250.93	338.87	8097.4
SAvg	66.8462	.00875	29.3816	10.4554	14.1195	337.391
VAvg	66.8456	8.74999	29.3816	10.4554	14.1195	337.391

100% Data Recovery

Station: STATE OF NC 94-4317 RALEIGH, NC 09/29/97

A-1

Chan:	AmbT	Rain	BP	Batt	H2O#1	H2O#2
Unit:	DegF	inch	inHg	VDC	ft	ft
00:00	63.66	0.0000	29.25	10.3	14.28	337.7
01:00	63.35	0.0000	29.22	10.29	14.31	337.7
02:00	63.88	0.0000	29.2	10.28	14.33	337.8
03:00	64.16	0.0000	29.18	10.26	14.36	337.7
04:00	64.59	0.0000	29.16	10.24	14.37	337.7
05:00	64.46	0.0000	29.15	10.23	14.37	337.7
06:00	64.51	0.0000	29.16	10.25	14.36	337.6
07:00	64.51	0.0000	29.17	10.2	14.35	337.6
08:00	64.71	0.0000	29.18	10.18	14.32	337.6
09:00	67.05	0.0000	29.22	10.2	14.28	337.6
10:00	67.48	0.0000	29.25	10.18	14.25	337.5
11:00	68.6	0.0000	29.28	10.12	14.22	337.5
12:00	70.2	0.0000	29.34	11.61	14.01	337.3
13:00	none	none	none	none	none	none
14:00	none	none	none	none	none	none
15:00	none	none	none	none	none	none
16:00	none	none	none	none	none	none
17:00	none	none	none	none	none	none
18:00	none	none	none	none	none	none
19:00	none	none	none	none	none	none
20:00	none	none	none	none	none	none
21:00	none	none	none	none	none	none
22:00	none	none	none	none	none	none
23:00	none	none	none	none	none	none
Total	851.16	0	379.76	134.34	185.81	4389
SAvg	65.4738	0	29.2123	10.3338	14.2930	337.615
VAvg	65.4733	0	29.2123	10.3338	14.2930	337.615

54.% Data Recovery

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ATTACHMENT 2
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PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

SOUTH MONITORING WELL BAROMETRIC PRESSURE AND WATER LEVEL DATA								
			Press-In H	H20 Level Ft				
		307			P+307		Summary	
24-Sep-97	1700		29.7	337	336.7	Average	29.64359	337.0758
24	1800		29.68	337	336.68	Medium	29.67	337
24	1900		29.66	337	336.66			
24	2000		29.64	337	336.64	Stnd Dev	0.20995	0.209676
24	2100		29.64	337	336.64	Variance	0.043959	0.043844
24	2200		29.62	337	336.62	min	29.15	336.7
24	2300		29.62	337.1	336.62	max	30.04	337.8
25	0		29.6	337.1	336.6			
25	100		29.58	337.1	336.58	Water Level Diff in in		13.2
25	200		29.55	337.1	336.55	Press Diff- Inch of Hg		0.89
25	300		29.53	337.1	336.53			
25	400		29.5	337.2	336.5			
25	500		29.48	337.2	336.48			
25	600		29.47	337.2	336.47			
25	700		29.47	337.2	336.47			
25	800		29.46	337.2	336.46			
25	900		29.46	337.2	336.46			
25	1000		29.46	337.2	336.46			
25	1100		29.46	337.2	336.46			
25	1200		29.44	337.2	336.44			
25	1300		29.43	337.2	336.43			
25	1400		29.43	337.2	336.43			
25	1500		29.4	337.2	336.4			
25	1600		29.38	337.2	336.38			
25	1700		29.37	337.2	336.37			
25	1800		29.37	337.2	336.37			
25	1900		29.37	337.3	336.37			
25	2000		29.36	337.3	336.36			
25	2100		29.36	337.3	336.36			
25	2200		29.37	337.2	336.37			
25	2300		29.38	337.2	336.38			
26	0		29.39	337.2	336.39			
26	100		29.4	337.2	336.4			
26	200		29.41	337.2	336.41			
26	300		29.41	337.2	336.41			
26	400		29.41	337.2	336.41			
26	500		29.41	337.2	336.41			
26	600		29.42	337.1	336.42			
26	700		29.45	337.1	336.45			
26	800		29.46	337.1	336.46			
26	900		29.49	337.1	336.49			
26	1000		29.54	337	336.54			
26	1100		29.58	337	336.58			
26	1200		29.61	336.9	336.61			
26	1300		29.62	336.9	336.62			
26	1400		29.62	336.9	336.62			

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PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

26	1500		29.62	336.9	336.62			
26	1600		29.62	336.9	336.62			
26	1700		29.62	336.9	336.62			
26	1800		29.6	337	336.6			
26	1900		29.61	337	336.61			
26	2000		29.62	337	336.62			
26	2100		29.62	336.9	336.62			
26	2200		29.65	336.9	336.65			
26	2300		29.66	336.9	336.66			
27	0		29.64	336.9	336.64			
27	100		29.63	337	336.63			
27	200		29.63	337	336.63			
27	300		29.63	337	336.63			
27	400		29.63	337	336.63			
27	500		29.62	337	336.62			
27	600		29.62	337	336.62			
27	700		29.63	337	336.63			
27	800		29.64	337	336.64			
27	900		29.65	337	336.65			
27	1000		29.66	336.9	336.66			
27	1100		29.7	336.9	336.7			
27	1200		29.72	336.9	336.72			
27	1300		29.72	336.9	336.72			
27	1400		29.7	336.9	336.7			
27	1500		29.68	336.9	336.68			
27	1600		29.66	337	336.66			
27	1700		29.65	337	336.65			
27	1800		29.63	337	336.63			
27	1900		29.62	337	336.62			
27	2000		29.62	337	336.62			
27	2100		29.6	337.1	336.6			
27	2200		29.59	337.1	336.59			
27	2300		29.58	337.1	336.58			
28	0		29.57	337.1	336.57			
28	100		29.54	337.1	336.54			
28	200		29.53	337.2	336.53			
28	300		29.51	337.2	336.51			
28	400		29.48	337.2	336.48			
28	500		29.46	337.3	336.46			
28	600		29.45	337.3	336.45			
28	700		29.45	337.3	336.45			
28	800		29.43	337.3	336.43			
28	900		29.41	337.3	336.41			
28	1000		29.4	337.4	336.4			
28	1100		29.4	337.4	336.4			
28	1200		29.38	337.4	336.38			
28	1300		29.36	337.4	336.36			
28	1400		29.34	337.4	336.34			
28	1500		29.31	337.5	336.31			

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PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

28	1600		29.29	337.5	336.29			
28	1700		29.28	337.5	336.28			
28	1800		29.27	337.6	336.27			
28	1900		29.26	337.6	336.26			
28	2000		29.26	337.6	336.26			
28	2100		29.27	337.6	336.27			
28	2200		29.26	337.6	336.26			
28	2300		29.25	337.6	336.25			
29	0		29.25	337.7	336.25			
29	100		29.22	337.7	336.22			
29	200		29.2	337.8	336.2			
29	300		29.18	337.7	336.18			
29	400		29.16	337.7	336.16			
29	500		29.15	337.7	336.15			
29	600		29.16	337.6	336.16			
29	700		29.17	337.6	336.17			
29	800		29.18	337.6	336.18			
29	900		29.22	337.6	336.22			
29	1000		29.25	337.5	336.25			
29	1100		29.28	337.5	336.28			
29	1200		29.34	337.3	336.34			
29	1300		29.43	337.3	336.43			
29	1400		29.43	337.3	336.43			
29	1500		29.41	337.3	336.41			
29	1600		29.4	337.3	336.4			
29	1700		29.4	337.3	336.4			
29	1800		29.4	337.3	336.4			
29	1900		29.38	337.4	336.38			
29	2000		29.35	337.4	336.35			
29	2100		29.35	337.4	336.35			
29	2200		29.36	337.4	336.36			
29	2300		29.37	337.4	336.37			
30	0		29.37	337.4	336.37			
30	100		29.37	337.4	336.37			
30	200		29.35	337.4	336.35			
30	300		29.35	337.4	336.35			
30	400		29.34	337.4	336.34			
30	500		29.33	337.4	336.33			
30	600		29.32	337.4	336.32			
30	700		29.33	337.4	336.33			
30	800		29.33	337.4	336.33			
30	900		29.34	337.4	336.34			
30	1000		29.35	337.4	336.35			
30	1100		29.37	337.3	336.37			
30	1200		29.38	337.3	336.38			
30	1300		29.37	337.3	336.37			
30	1400		29.36	337.4	336.36			
30	1500		29.35	337.4	336.35			
30	1600		29.35	337.4	336.35			

PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

30	1700		29.35	337.4	336.35			
30	1800		29.37	337.3	336.37			
30	1900		29.38	337.4	336.38			
30	2000		29.38	337.3	336.38			
30	2100		29.4	337.3	336.4			
30	2200		29.42	337.3	336.42			
30	2300		29.43	337.3	336.43			
Oct 1 199	0		29.44	337.3	336.44			
1	100		29.44	337.3	336.44			
1	200		29.44	337.3	336.44			
1	300		29.44	337.3	336.44			
1	400		29.43	337.3	336.43			
1	500		29.42	337.3	336.42			
1	600		29.42	337.3	336.42			
1	700		29.43	337.3	336.43			
1	800		29.44	337.3	336.44			
1	900		29.46	337.2	336.46			
1	1000		29.49	337.2	336.49			
1	1100		29.54	337.2	336.54			
1	1200		29.56	337.2	336.56			
1	1300		29.57	337.1	336.57			
1	1400		29.57	337.1	336.57			
1	1500		29.57	337.1	336.57			
1	1600		29.58	337.1	336.58			
1	1700		29.59	337.1	336.59			
1	1800		29.61	337.1	336.61			
1	1900		29.61	337.1	336.61			
1	2000		29.61	337.1	336.61			
1	2100		29.62	337.1	336.62			
1	2200		29.63	337.1	336.63			
1	2300		29.64	337	336.64			
2	0		29.67	337	336.67			
2	100		29.69	337	336.69			
2	200		29.69	337	336.69			
2	300		29.69	337	336.69			
2	400		29.68	337	336.68			
2	500		29.68	337	336.68			
2	600		29.7	336.9	336.7			
2	700		29.72	336.9	336.72			
2	800		29.74	336.9	336.74			
2	900		29.76	336.9	336.76			
2	1000		29.78	336.8	336.78			
2	1100		29.83	336.8	336.83			
2	1200		29.86	336.7	336.86			
2	1300		29.86	336.7	336.86			
2	1400		29.84	336.8	336.84			
2	1500		29.82	336.8	336.82			
2	1600		29.81	336.8	336.81			
2	1700		29.8	336.8	336.8			

PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

2	1800		29.79	336.8	336.79			
2	1900		29.77	336.9	336.77			
2	2000		29.73	336.9	336.73			
2	2100		29.71	336.9	336.71			
2	2200		29.71	336.9	336.71			
2	2300		29.7	336.9	336.7			
3	0		29.7	336.9	336.7			
3	100		29.69	336.9	336.69			
3	200		29.68	336.9	336.68			
3	300		29.67	337	336.67			
3	400		29.65	337	336.65			
3	500		29.65	337	336.65			
3	600		29.65	337	336.65			
3	700		29.66	337	336.66			
3	800		29.68	337	336.68			
3	900		29.68	336.9	336.68			
3	1000		29.71	336.9	336.71			
3	1100		29.76	336.9	336.76			
3	1200		29.77	336.9	336.77			
3	1300		29.77	336.9	336.77			
3	1400		29.75	336.9	336.75			
3	1500		29.74	336.9	336.74			
3	1600		29.72	336.9	336.72			
3	1700		29.72	336.9	336.72			
3	1800		29.71	336.9	336.71			
3	1900		29.7	337	336.7			
3	2000		29.67	337	336.67			
3	2100		29.66	337	336.66			
3	2200		29.65	337	336.65			
3	2300		29.65	337	336.65			
4	0		29.65	337	336.65			
4	100		29.65	337	336.65			
4	200		29.65	337	336.65			
4	300		29.65	337	336.65			
4	400		29.65	337	336.65			
4	500		29.65	337	336.65			
4	600		29.66	337	336.66			
4	700		29.67	337	336.67			
4	800		29.69	337	336.69			
4	900		29.71	337	336.71			
4	1000		29.74	336.9	336.74			
4	1100		29.79	336.9	336.79			
4	1200		29.8	336.9	336.8			
4	1300		29.8	336.9	336.8			
4	1400		29.78	336.9	336.78			
4	1500		29.78	336.9	336.78			
4	1600		29.77	336.9	336.77			
4	1700		29.77	336.9	336.77			
4	1800		29.78	336.9	336.78			

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PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

4	1900		29.77	336.9	336.77			
4	2000		29.74	337	336.74			
4	2100		29.74	337	336.74			
4	2200		29.74	337	336.74			
4	2300		29.74	337	336.74			
5	0		29.74	337	336.74			
5	100		29.74	337	336.74			
5	200		29.73	337	336.73			
5	300		29.73	337	336.73			
5	400		29.72	337	336.72			
5	500		29.72	337	336.72			
5	600		29.72	337	336.72			
5	700		29.73	337	336.73			
5	800		29.73	337	336.73			
5	900		29.75	337	336.75			
5	1000		29.79	336.9	336.79			
5	1100		29.84	336.9	336.84			
5	1200		29.85	336.9	336.85			
5	1300		29.85	336.9	336.85			
5	1400		29.83	336.9	336.83			
5	1500		29.82	336.9	336.82			
5	1600		29.81	336.9	336.81			
5	1700		29.8	336.9	336.8			
5	1800		29.8	336.9	336.8			
5	1900		29.79	337	336.79			
5	2000		29.76	337	336.76			
5	2100		29.75	337	336.75			
5	2200		29.75	337	336.75			
5	2300		29.75	337	336.75			
6	0		29.76	337	336.76			
6	100		29.76	337	336.76			
6	200		29.76	337	336.76			
6	300		29.76	337	336.76			
6	400		29.75	337	336.75			
6	500		29.75	337	336.75			
6	600		29.77	337	336.77			
6	700		29.77	337	336.77			
6	800		29.78	337	336.78			
6	900		29.8	337	336.8			
6	1000		29.84	336.9	336.84			
6	1100		29.89	336.9	336.89			
6	1200		29.9	336.9	336.9			
6	1300		29.89	336.9	336.89			
6	1400		29.88	336.9	336.88			
6	1500		29.86	336.9	336.86			
6	1600		29.85	336.9	336.85			
6	1700		29.85	336.9	336.85			
6	1800		29.85	336.9	336.85			
6	1900		29.84	337	336.84			

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PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

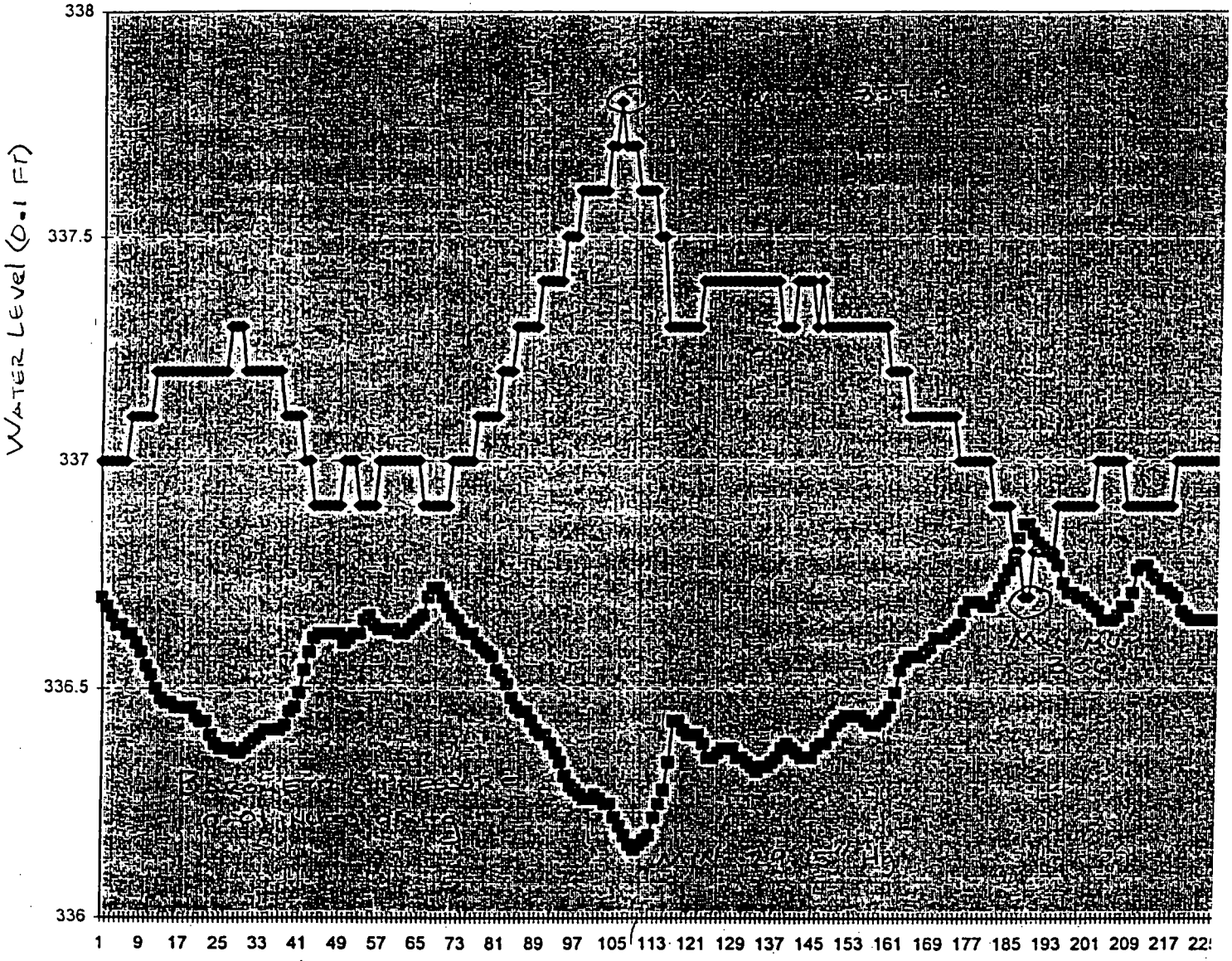
6	2000		29.82	337	336.82			
6	2100		29.81	337	336.81			
6	2200		29.8	337	336.8			
6	2300		29.8	337	336.8			
7	0		29.79	337	336.79			
7	100		29.79	337	336.79			
7	200		29.78	337	336.78			
7	300		29.78	337	336.78			
7	400		29.77	337	336.77			
7	500		29.78	337	336.78			
7	600		29.78	337	336.78			
7	700		29.79	337	336.79			
7	800		29.8	337	336.8			
7	900		29.82	337	336.82			
7	1000		29.84	337	336.84			
7	1100		29.88	336.9	336.88			
7	1200		29.89	336.9	336.89			
7	1300		29.88	336.9	336.88			
7	1400		29.87	337	336.87			
7	1500		29.86	337	336.86			
7	1600		29.85	337	336.85			
7	1700		29.85	337	336.85			
7	1800		29.86	337	336.86			
7	1900		29.86	337	336.86			
7	2000		29.84	337	336.84			
7	2100		29.83	337	336.83			
7	2200		29.83	337	336.83			
7	2300		29.83	337	336.83			
8	0		29.83	337	336.83			
8	100		29.83	337	336.83			
8	200		29.83	337	336.83			
8	300		29.83	337	336.83			
8	400		29.82	337.1	336.82			
8	500		29.83	337.1	336.83			
8	600		29.84	337	336.84			
8	700		29.86	337	336.86			
8	800		29.88	337	336.88			
8	900		29.9	337	336.9			
8	1000		29.92	336.9	336.92			
8	1100		29.96	336.9	336.96			
8	1200		29.98	336.9	336.98			
8	1300		29.99	336.9	336.99			
8	1400		29.98	336.9	336.98			
8	1500		29.96	336.9	336.96			
8	1600		29.95	336.9	336.95			
8	1700		29.95	336.9	336.95			
8	1800		29.95	336.9	336.95			
8	1900		29.94	337	336.94			
8	2000		29.92	337	336.92			

A2
8/8

PCB LANDFILL
Monitoring Data
September 24- October 9, 1997

8	2100		29.92	337	336.92			
8	2200		29.93	336.9	336.93			
8	2300		29.93	336.9	336.93			
9	0		29.93	336.9	336.93			
9	100		29.93	336.9	336.93			
9	200		29.93	336.9	336.93			
9	300		29.94	336.9	336.94			
9	400		29.93	336.9	336.93			
9	500		29.94	336.9	336.94			
9	600		29.95	336.9	336.95			
9	700		29.96	336.9	336.96			
9	800		29.97	336.9	336.97			
9	900		29.99	336.8	336.99			
9	1000		30.01	336.8	337.01			
9	1100		30.03	336.8	337.03			
9	1200		30.04	336.8	337.04			
9	1300		30.03	336.8	337.03			
9	1400		30.01	336.8	337.01			
9	1500		29.99	336.8	336.99			
9	1600		29.98	336.8	336.98			
9	1700		29.97	336.8	336.97			
9	1800		29.96	336.9	336.96			
9	1900		29.95	336.9	336.95			
9	2000		29.94	336.9	336.94			
9	2100		29.93	336.9	336.93			
9	2200		29.93	336.9	336.93			
9	2300		29.93	336.9	336.93			
10	1200		29.99	336.8	336.99			

PCB LANDFILL
Hourly Barometric Pressure and Water Leve
September 24- October 9 , 1997



Water Elevation in tents of a foot

Measured Leachate Elevation at Air Vent Well - Reference Elevation = 357.07						
Date	Elevation		Rain (in)	Year Rain	Ral BP	
12/19/94	336.41	1	1	40.28	30.26	
1/25/85	336.37	2	4.5		30.24	
2/23/95	336.25	3	3.7		30.09	
3/29/95	336.42	4	6.17		30.08	
4/27/95	336.44	5	1.72		30.09	
5/24/95	336.32	6	3.39		30.19	
6/22/95	336.35	7	9.33		29.99	
7/21/95	336.64	8	6.12		29.96	
8/28/95	none	9	4.45		29.91	
9/25/95	none	10	3.17		30.06	
10/24/95	336.7	11	8.21		30.19	
11/20/95	336.79	12	4.06		30.11	
12/20/95	337	13	2.03	56.85	29.74	
1/26/96	336.12	14	5.12		30.4	
2/23/96	336.44	15	3.79		29.88	
3/29/96	336.88	16	3.39		30.03	
4/26/96	336.08	17	3.72		29.47	
5/31/96	none	18	4.13		30.24	
6/28/96	336.32	19	6.48		30.13	
7/26/96	336.63	20	5.4		none	
8/30/96	336.95	21	5.8		30.07	
9/16/96	337.06	22	9.26		29.98	
10/28/96	337.05	23	4.81		30.06	
10/29/96	337.11	24			30.04	
11/8/96	337.88	25			29.75	
11/25/96	337.71	26	4.09		30.11	
12/20/96	337.61	27	4.59	60.58	30.45	
Jan-97	336.79	28	3.04		30.46	
Feb-97	337.25	29	2.78		29.97	
Mar-97	none	30	3.39		30.31	
4/7/97	337.2	31	4.98		29.91	
5/28/97	336.79	32	0.87		30.34	
6/30/97	337.3	33	5.82		30.08	
7/30/97	337.52	34			30.17	
8/26/97	337.64	35			30.1	
9/29/97	337.9	36			29.9	
10/10/97	337.63	37	0		29.97	

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2/2

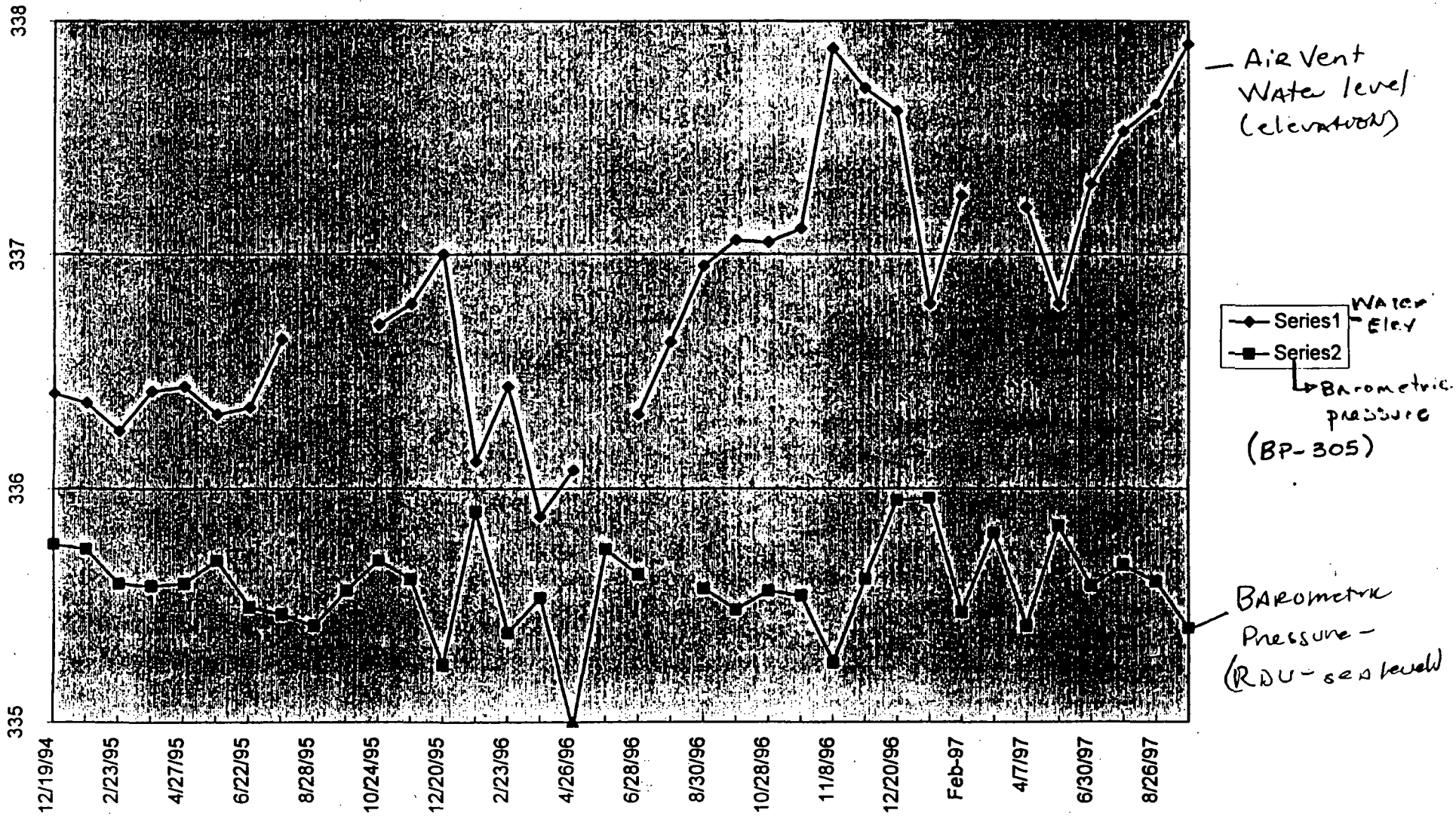
Summary, By Total and Year
of
Measured Air Vent Water Elevation and Parometric Pressure (RDU corrected to sea level)

H2O level	Total Data	1995	1996	1997	Pressure	Total Data	1995	1996	1997
Mean	336.8955	336.5173	336.9108	337.3356		30.07583	30.07	30.04692	30.121
Median	336.79	336.42	336.95	337.3		30.08	30.09	30.06	30.09
Stnd Dev	0.534217	0.232985	0.585654	0.379839					
VAr	0.285388	0.054282	0.342991	0.144278					
Slope	0.03805	0.04922	0.119551	0.099941					
Max (ft)	337.9	337	337.88	337.9		30.46	30.26	30.45	30.46
Min (ft)	336.08	336.25	336.08	336.79		29.47	29.74	29.47	29.9
Spread(in)	21.84	9	21.6	13.32		0.99	0.52	0.98	0.56

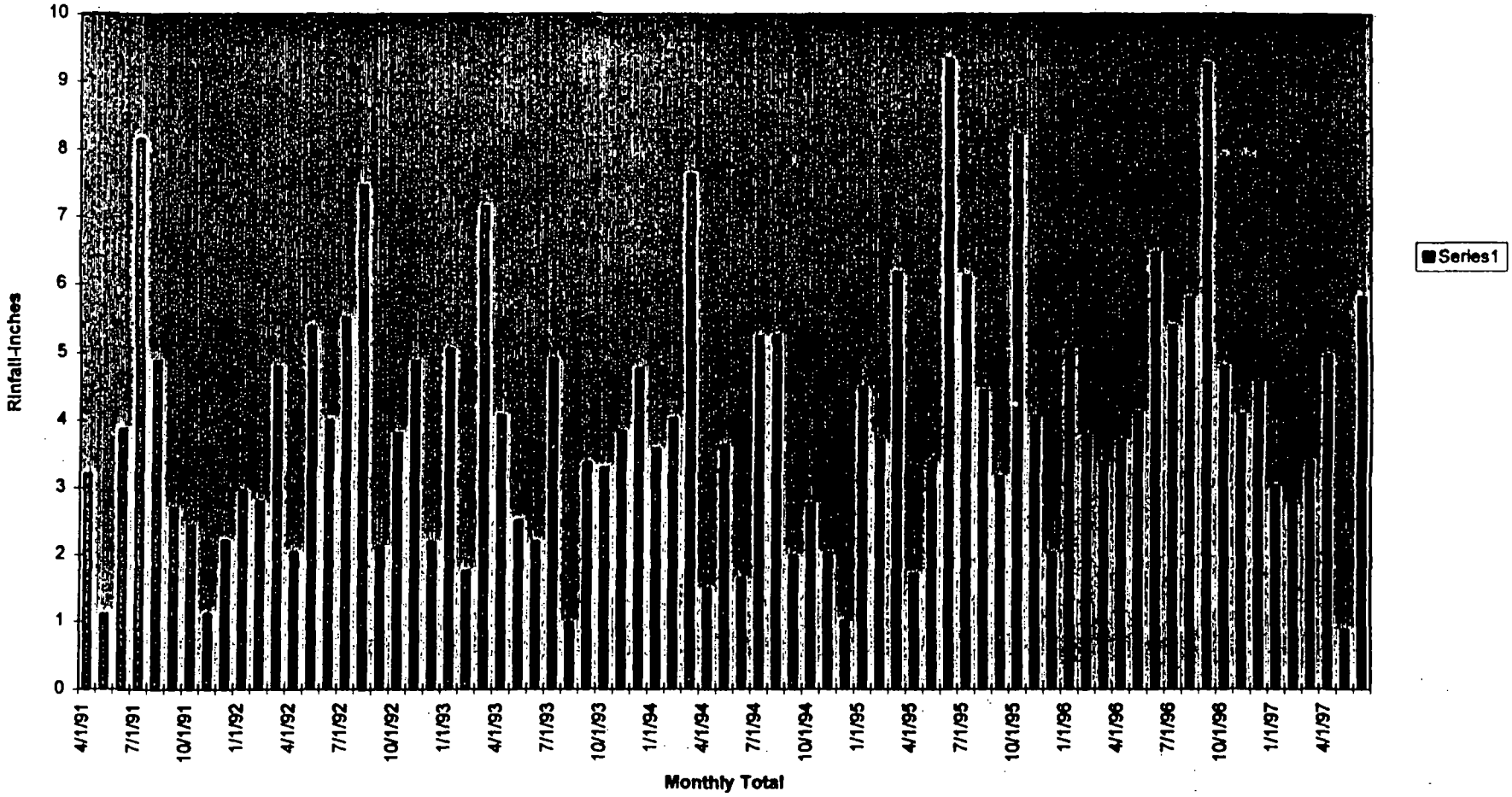
ATTACHMENT 5

PCB AIR VENT WATER LEVELS Versus RALEIGH Pressure

12/94 - 9/97



Rain Fall Data-Arcola Station



State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Waste Management

James B. Hunt, Jr., Governor
Wayne McDevitt, Secretary
William L. Meyer, Director

DEHNR

MEMO

TO: Mike Kelly

FROM: Wendy Peacock

DATE: March 10, 1997

RE: Methane Monitoring at the Warren County Landfill

BACKGROUND

The Warren County landfill is similar to other landfills located within the state whereas it produces methane gas. Methane (CH_4) is a colorless and odorless gas that is a by product of anaerobic decomposition. CH_4 is lighter than air by volume and very volatile. If methane is in the 5 to 15% concentration range, a source of ignition will set off an explosion. Gas produced in the landfill move by two forces, diffusion and pressure gradient. Diffusion is the physical phenomenon that causes a gas to seek a uniform concentration. In other words, the gas will move away from areas of higher concentration towards areas of lower concentration. The same is true for the pressure gradient. CH_4 will move from higher zones of pressure to lower zones of pressure. Yet, changing barometric pressure, rainfall and frozen ground may also cause the gas to move in unpredictable or not previously observed directions.

TESTING PROCEDURES

Methane readings were conducted using the LANDTEC GA-90 gas analyzer. This instrument uses an infrared beam to analyze landfill specific gases such as methane, carbon dioxide and oxygen. A balance gas consisting of nitrogen and xylene with other atmospheric gases is also examined. The GA-90 gives a digital reading of landfill gases pumped through the machine to be analyzed.

SAMPLING

On January 29, 1997, during a routine inspection of the landfill, methane testing was conducted. This testing involved the use of the center vent as the methane source. Again the GA-90 was used as the measurement device. The data is located in Appendix A

On January 13, 1997 the Warren County landfill was surveyed. The boundary of the plastic liner was identified and marked at 50' intervals and 12" deep bore holes were dug and capped for future evaluation. The testing was conducted on February 7, 1997. The results and location of the bore holes are located in Appendix B. Because of the previous rainfall some of the borehole were saturated with water, therefore a reading could not be conducted. Those locations are marked with an X.

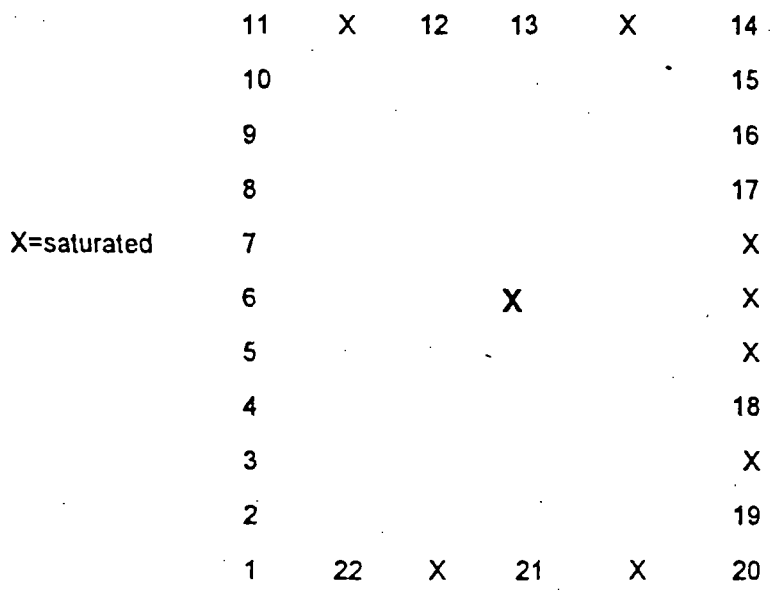
The last set of gas measurements were taken from the newly installed bore holes located on the south and north sides of the center vent. These wells were installed, on February 19 and 26, respectively, at a lower depth than the center vent. After each well was complete a methane reading was taken. A second reading was obtained after letting the well vent for 1 hour. The results of this sampling episode are located in Appendix C.

APPENDIX A

Code	Time	Date	CH4	LEL	CO2	O2	Bal	Atmospheric Pressure	Temperature	Depth
			%	%	%	%	%	"Hg	øF	Feet
PCB00CV	1:57	1/29/97	0.8	16	0.7	20.8	77.7	30.4	42.7	24
PCB00CV	2:01	1/29/97	1.1	22	0.7	20.8	77.4	30.4	48.3	24

APPENDIX B

Code	Time	Date	CH4	LEL	CO2	O2	Bal	Atmospheric Pressure	Temperature	Depth
			%	%	%	%	%	"Hg	øF	Feet
C0010001	10:11	2/7/97	0	0	0.7	18.6	80.7	29.8	approx 47	1
C0010004	10:18	2/7/97	0	0	0.1	20.3	79.6	29.8		1
C0010005	10:20	2/7/97	0	0	0	20.5	79.5	29.8		1
C0010006	10:22	2/7/97	0	0	0.1	20.3	79.6	29.8		1
C0010007	10:24	2/7/97	0	0	0.9	12.3	86.8	29.8		1
C0010008	10:27	2/7/97	0	0	0	20.5	79.5	29.8		1
C0010009	10:29	2/7/97	0	0	0.4	20.1	79.5	29.8		1
C0010010	10:31	2/7/97	0	0	0	20.5	79.5	29.8		1
C0010011	10:32	2/7/97	0	0	0	20.5	79.5	29.8		1
C0010012	10:36	2/7/97	0	0	1.3	18.4	80.3	29.8		1
C0010013	10:38	2/7/97	0	0	0	20.6	79.4	29.8		1
C0010015	10:42	2/7/97	0	0	2.9	14.3	82.8	29.8		1
C0010016	10:44	2/7/97	0	0	0	20.7	79.3	29.8		1
C0010017	10:46	2/7/97	0	0	0	20.7	79.3	29.8		1
C0010018	10:48	2/7/97	0	0	0	20.7	79.3	29.8		1
C0010022	10:52	2/7/97	0	0	0	20.6	79.4	29.8		1
C0010024	10:55	2/7/97	0	0	0	8.1	91.9	29.7		1
C0010025	10:57	2/7/97	0	0	0.6	19.5	79.9	29.7		1



APPENDIX C

Code	Time	Date	CH4	LEL	CO2	O2	Bal	Atmospheric Pressure	Temperature	Depth
			%	%	%	%	%	"Hg	øF	Feet
PCBMW1	1:46	2/19/97	32.7	654	12.4	8.7	46.2	29.6		28
PCB00CV	1:58	2/19/97	4.2	84	3.1	4.5	88.2	29.5		24
PCBMW2	9:05	2/27/97	64.5	1290	24.1	1.6	9.8	29.5		29
PCBMW1	10:49	2/27/97	44.1	882	14.3	7.8	33.8	29.4		29
PCBMW2	11:02	2/27/97	35.3	706	13.4	10	41.3	29.4		28
PCB00CV	11:29	2/27/97	0.1	2	0	20.7	79.2	29.4		24

Reference: To find PPM multiply $\%CH_4$ by 10,000

CONCLUSION

Methane gas concentrations are influenced by the barometric pressure and temperature. During the initial stages of testing the temperature ranged from the lower to mid 40's. As the testing increased through the month of February, temperatures did not change, although the barometric pressure was sparatic throughout the month. As the end of February approached, the normal North Carolina temperatures began to appear causing methane amounts to increase. As the monthly inspections continue, the methane ranges are expected to increase as temperatures increase.

Methane production has a predicted life of 10 to 20 years during normal conditions. Using a plastic/synthetic liner limits the amount of water infiltration thus, reducing methane production. There appears to be sufficient water in the landfill such that gas production levels have not dropped significantly in the past 10 to 15 years. If the water were to be removed from the landfill, it is reasonable to predict that gas production would be significantly curtailed.

cc: Bill Meyer
Phil Prete
Larry Rose
Ed Mussler

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Waste Management

James B. Hunt, Jr., Governor
Wayne McDevitt, Secretary
William L. Meyer, Director

DEHNR

MEMO

DATE: October 6, 1997

TO: Mike Kelly

FROM: Wendy Peacock WRP

RE: Methane Monitoring at the PCB Landfill

Methane Monitoring was conducted at the PCB Landfill located in Warren County on Friday, October 3, 1997. Methane readings were taken using the LANDTEC GA-90 gas analyzer. The GA-90 uses an infrared beam to analyze the amount of methane, carbon dioxide and oxygen within landfill gas.

As the monitoring plan indicated 12 inch bore holes were placed into the landfill surface using a bar punch probe. Each sample was taken in approximately 25 foot increments inside the landfill liner boundary. The results and locations for the bore holes are located in Appendix B. Additional readings were taken at the previously installed gas/water monitoring wells.

TESTING PROCEDURES

Monitoring began by taking readings from the installed monitoring wells, starting with the center vent and moving to the north and south areas. A reading was taken immediately after uncovering each well and then 2 hours later after venting. These readings are located in Appendix B.

After recording the initial readings from the wells, the surface monitoring began. The four corners of the landfill cell boundary were approximately established, these are 116 feet from the center of the landfill on both the east and west side. The first bore hole and sample was made approximately 30 feet from the east side of the pump house. Then walking south, samples were taken every approximately 25' until the south cell boundary was reached (Line A: East side - PCBEA). Starting from the original bore hole a second line (Line EB) was established 35' east. Again samples were taken every 25' along the line. A final sample line (Line EC) was made 70' from the original bore hole and samples were taken every 25'. The same process was repeated on the west side of the pump house. (Line A: West side - PBCWA). A diagram of the sampling process can be found in Appendix A.

RESULTS

The temperature on the landfill was a consistent 67°F. Landfill conditions were overly very dry. This helped tremendously with obtaining accurate samples.

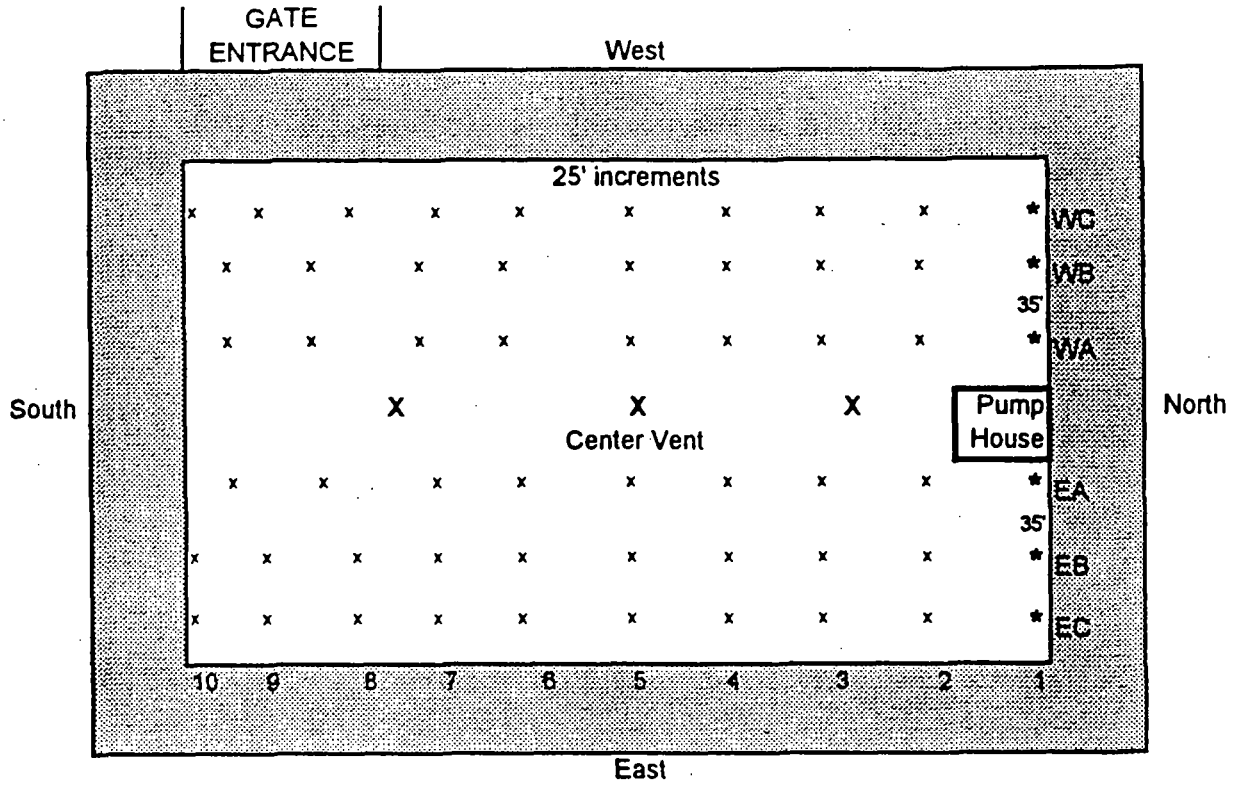
The majority of the samples showed no amount of methane escaping through the surface of the landfill, especially on the west side. A few of the samples on the east side gave a low carbon dioxide reading along the surface. One east side sample showed a slight amount of methane (EB/1). After testing the rest of the line an additional bore hole was made from this location. No amount of methane gas was detected. This could be caused by not purging the system after each use.

CONCLUSION

Methane gas concentration are influenced by the temperature and barometric pressure. On the specific day of sampling the temperature and barometric pressure were constant throughout. Both cell boundary and random surface testing have not shown any amount of methane escaping through the landfill surface. Additional methane monitoring will continue on a monthly basis using the installed wells as a monitoring instrument.

cc: Bill Meyer
Phil Prete
Larry Rose
Ed Mussler

Appendix A



Appendix B

Gas Analyser Data:

Code	Time	Date	CH4	CO2	O2	Bal	Location
			%	%	%	%	
PCB - cent	12:03	10/3/97	0	0	20.6	79.4	center vent
PCB - north	12:10	10/3/97	54.6	24.2	3.5	17.7	north well
PCB - south	12:14	10/3/97	1.8	1.9	18.2	78.1	south well
PCB - cent	2:10	10/3/97	0	0	20.5	79.5	center vent
PCB - north	2:16	10/3/97	17.4	7.5	14.6	60.5	north well
PCB - south	2:13	10/3/97	0.6	0.5	19.3	79.6	south well

EAST

Code	Time	Date	CH4	CO2	O2	Bal
			%	%	%	%
PCB EA/1	12:26	10/3/97	0	0	20.6	79.4
PCB EA/2	12:28	10/3/97	0	0	20.6	79.4
PCB EA/3	12:29	10/3/97	0	0	20.6	79.4
PCB EA/4	12:30	10/3/97	0	0	20.6	79.4
PCB EA/5	12:30	10/3/97	0	0.6	20	79.4
PCB EA/6	12:32	10/3/97	0	0	20.6	79.4
PCB EA/7	12:34	10/3/97	0	0	20.6	79.4
PCB EA/8	12:36	10/3/97	0	0	20.6	79.4
PCB EA/9	12:38	10/3/97	0	0	20.6	79.4
PCB EB/1	12:43	10/3/97	0.3	0	20.4	79.3
PCB EB/2	12:44	10/3/97	0	0	20.6	79.4
PCB EB/3	12:46	10/3/97	0	0	20.6	79.4
PCB EB/4	12:47	10/3/97	0	0.1	20.5	79.4
PCB EB/5	12:49	10/3/97	0	0	20.6	79.4
PCB EB/6	12:51	10/3/97	0	0	20.6	79.4
PCB EB/7	12:52	10/3/97	0	0	20.6	79.4
PCB EB/8	12:54	10/3/97	0	0	20.6	79.4
PCB EB/9	12:56	10/3/97	0	0	20.6	79.4
PCB EB/10	12:58	10/3/97	0	0	20.6	79.4
PCB EC/1	1:03	10/3/97	0	0	20.6	79.4
PCB EC/2	1:05	10/3/97	0	0	20.6	79.4
PCB EC/3	1:07	10/3/97	0	0	20.6	79.4
PCB EC/4	1:09	10/3/97	0	0	20.6	79.4
PCB EC/5	1:11	10/3/97	0	0	20.6	79.4
PCB EC/6	1:13	10/3/97	0	0	20.6	79.4
PCB EC/7	1:15	10/3/97	0	0	20.6	79.4
PCB EC/8	1:16	10/3/97	0	0	20.6	79.4
PCB EC/9	1:18	10/3/97	0	0.4	20.1	79.5
PCB EC/10	1:19	10/3/97	0	0	20.6	79.4

WEST

Code	Time	Date	CH4	CO2	O2	Bal
			%	%	%	%
PCB WA/1	1:26	10/3/97	0	0	20.6	79.4
PCB WA/2	1:27	10/3/97	0	0	20.6	79.4
PCB WA/3	1:29	10/3/97	0	0	20.6	79.4
PCB WA/4	1:30	10/3/97	0	0	20.6	79.4
PCB WA/5	1:32	10/3/97	0	0	20.6	79.4
PCB WA/6	1:33	10/3/97	0	0	20.6	79.4
PCB WA/7	1:34	10/3/97	0	0	20.6	79.4
PCB WA/8	1:35	10/3/97	0	0	20.6	79.4
PCB WA/9	1:36	10/3/97	0	0	20.6	79.4
PCB WB/1	1:39	10/3/97	0	0	20.6	79.4
PCB WB/2	1:40	10/3/97	0	0	20.6	79.4
PCB WB/3	1:42	10/3/97	0	0	20.6	79.4
PCB WB/4	1:43	10/3/97	0	0	20.6	79.4
PCB WB/5	1:44	10/3/97	0	0	20.6	79.4
PCB WB/6	1:46	10/3/97	0	0	20.6	79.4
PCB WB/7	1:47	10/3/97	0	0	20.6	79.4
PCB WB/8	1:50	10/3/97	0	0	20.6	79.4
PCB WB/9	1:52	10/3/97	0	0	20.6	79.4
PCB WC/1	1:54	10/3/97	0	0	20.6	79.4
PCB WC/2	1:55	10/3/97	0	0	20.6	79.4
PCB WC/3	1:57	10/3/97	0	0	20.6	79.4
PCB WC/4	1:58	10/3/97	0	0	20.6	79.4
PCB WC/5	1:59	10/3/97	0	0	20.6	79.4
PCB WC/6	2:01	10/3/97	0	0	20.6	79.4
PCB WC/7	2:02	10/3/97	0	0	20.6	79.4
PCB WC/8	2:03	10/3/97	0	0	20.6	79.4
PCB WC/9	2:05	10/3/97	0	0	20.6	79.4
PCB WC/10	2:07	10/3/97	0	0	20.6	79.4

PCB Landfill
Methane Monitoring

Environmental Efficiency

Quality Assurance Laboratory Data Evaluation for State of North Carolina DEHNR Solid Waste Management Division

prepared by

James A. Ploscyca
Environmental Efficiency
(919) 676-6947

prepared for

Mr. Michael Kelly
North Carolina DEHNR
Solid Waste Management Division
P.O. Box 27687
Raleigh, North Carolina 27611-7687

October 2, 1997

Introduction:

In early August, 1997, Mr. James A. Ploscyca of Environmental Efficiency was contracted to compile and tabulate various environmental data associated with the Warren County Landfill site.

This compilation of data was completed and presented to Mr. Kelly at a meeting which took place on September 2, 1997.

Review of the tabulated data indicated that the most common contaminant being detected in the samples was Octachlorodibenzodioxin (OCDD). This compound was reported in every groundwater sample collected at the site, but was also detected in many of the field and laboratory blank samples. In an effort to verify the validity of the OCDD results, Mr. Ploscyca was requested to evaluate the data for possible field or laboratory contamination.

The evaluation utilized a USEPA, Region IV document entitled "Data Validation Standard Operating Procedures for Polychlorinated Dibenzodioxin and Polychlorinated Dibenzofurans" September 1996, as guidance. The primary focus of the data evaluation was Section VII of the document (See Attachment 1) which addresses method blank evaluation.

Summary of Findings:

The following tables list samples by analytical groupings referred to as Sample Delivery Groups or SDGs. The laboratory utilizes SDGs to track internal laboratory quality control associated with particular samples. Each sample grouping has one or more Method Blanks associated with the analysis of samples. The table lists samples in a particular SDG and then the associated Method Blank results.

The most common compounds detected in the samples were HPCDD and OCCD and the third column in the table lists their respective concentrations in each of the samples and blanks. A designation of "Plus" in the third column indicates that additional compounds beyond HPCDD and OCCD were detected in the sample.

The values listed in column 4 represent the concentration levels found in the blanks multiplied by a factor of ten. The EPA data validation document (See Attachment 1) states:

"Any compound detected in the sample that was also detected in any associated blank is not reported if the sample concentration is less than ten times (10x) the blank concentration."

If the sample exceeded the Blank cutoff level, column five indicates an "R" flag which signifies that the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Page 18 of the EPA document also indicates that data qualification should be based upon comparison with the associated blank having the **highest** concentration of a contaminant.

Associated blanks include the extraction method blanks.

The highest water extraction blank was BL0414WB with HPCDD and OCCD concentrations of 4 and 140 pg/L respectively. A level of 140 pg/L of OCDD indicates a severe laboratory contamination problem which may be reflected in the reported sample concentrations.

Samples with a "RR"qualifier indicate they are rejected since their concentrations are less than 10x the levels found in the highest extraction blank. The highest soil extraction blank was BL0414SA with HPCDD and OCCD concentrations of 1.1 and 31 ng/Kg respectively. Samples qualified with an asterisk (*) appear to be valid reported concentrations according to the EPA (10x) rule. Unfortunately, the "R" or "RR" flag was determined to be applicable in the majority of cases.

In conclusion, it is my recomendation that extreme caution be used when attempting to utilize this data to make important environmental decisions. There is clear evidence of widespread sample contamination during sample processing at the laboratory. The presence of this contamination makes it difficult, if not impossible, to rely on the generated data with any degree of confidence. Since the scope of contamination was so broad, (not limited to merely a couple of blank samples), it is difficult to have confidence in the data set as a whole, since it may not accurately reflect actual field conditions.

There were two water samples, JDH and QAR which yielded relatively high concentrations of analytes compared to the other samples collected. It may be prudent to take a closer look at these locations if additional analytical work is performed.

Please do not hesitate to contact me at (919) 676-6947 if you have any questions or comments on this report.

Sincerely,

James A. Ploscyca
Principal, Environmental Efficiency

Environmental Efficiency

SDG #	Sample/Blank	HPCDD OCCD Conc.	Blank Cutoff	Qualifier
29087	DMA	1 ng/Kg 47 ng/Kg		R R
	HESS	2.2 ng/Kg 432 ng/Kg		R *
	LESS	1.7 ng/Kg 245 ng/Kg		R R
	BL0414SA (Blank)	1.1 ng/Kg 31 ng/Kg	11 310 (Highest Soil Blank)	Blank
29087	ASH	ND 13 pg/L		- R
	JD	4.5 pg/L 42 pg/L		R R
	JAD	3.8 pg/L 24 pg/L		R R
	MMM	2.1 pg/L 14 pg/L		R R
	RAJR	4.5 pg/L 30 pg/L		R R
	RRAM	ND 20 pg/L		- R
	BL0414WB (Blank)	4 pg/L 140 pg/l.	40 1400 (Highest Water Blank)	Blank

SDG #	Sample/Blank	HPCDD OCCD Conc.	Blank Cutoff	Qualifier
29087	ALB	2.9 pg/L 22 pg/L		R R
	BB	6.8 pg/L 48 pg/L		R R
	BT	3.2 pg/L 18 pg/L		R R
	JDW	4 pg/L 22 pg/L		R R
	KTB	4.8 pg/L 26 pg/L		R R
	PSG	4.6 pg/L 32 pg/L		R R
	RBAB	3.9 pg/L 18 pg/L		R R
	RPS	4 pg/L 37 pg/L		R R
	TB	11 pg/L 357 pg/L		R RR
	BL0414WA (Blank)	4.2 pg/L 33 pg/L	42 330	Blank

SDG #	Sample/Blank	HPCDD OCCD Conc.	Blank Cutoff	Qualifier
29087	AJ	7.5 pg/L 54 pg/L		R R
	ADJ	10 pg/L 88 pg/L		R R
	AW	19 pg/L 150 pg/L		R R
	CC	7.5 pg/L 99 pg/L		R R
	CEH	4 pg/L 17 pg/L		R R
	DRK	ND 29 pg/L		- R
	JDH	1041 pg/L 10053 pg/L Plus		* *
	JOK	ND 18 pg/L		- R
	RDRJ	5 pg/L 17 pg/L		R R
	RPAB	10 pg/L 98 pg/L		R R
	RPF	ND 21 pg/L		- R
	BL0414WA (Blank)	4.2 pg/L 33 pg/L	42 330	Blank
28760	ADF	3.0 pg/L 20 pg/L		RR R
	MB	6.1 pg/L 40 pg/L		R R
	BLO310WF (Blank)	ND 10 pg/L	100	Blank
28760	DM	ND 2.7 ng/Kg		- R
	HM	ND 1.8 ng/Kg		- R
	BLO310SC (Blank)	ND 2.4 ng/Kg	24	Blank

Environmental Efficiency

SDG #	Sample/Blank	HPCDD OCCD Conc.	Blank Cutoff	Qualifier
28760	KM	ND 1.4 ng/Kg		- R
	MM	ND 2.6 ng/Kg		- R
	NIAB	2 ng/Kg 76 ng/Kg		R RR
	PMB	0.5 ng/Kg 24 ng/Kg		R R
	WM	.3 ng/Kg 1 ng/Kg		R R
	BLO310SC (Blank)	0.3 ng/Kg 2.4 ng/Kg	3 24	Blank
28760	JABP	15 ng/Kg 249 ng/Kg Plus		* RR
	JABT	21 ng/Kg 789 ng/Kg Plus		* *
	BLO317SD (Blank)	ND 0.7 ng/Kg	7	Blank
28760	JABB	79 ng/Kg 1660 ng/Kg Plus		* *
	NIAP	21 ng/Kg 697 ng/Kg Plus		* *
	NIAT	6 ng/Kg 219 ng/Kg Plus		RR RR
	BLO317SD (Blank)	ND 1.1 ng/Kg		Blank
28835	CB	2.3 ng/Kg 125 ng/Kg		RR RR
	MS	1.3 ng/Kg 70 ng/Kg		RR RR
	BL0317SD (Blank) A102932#1	ND 1.1 ng/Kg	11	Blank

SDG #	Sample/Blank	HPCDD OCCD Conc.	Blank Cutoff	Qualifier
28835	AR	2.7 ng/Kg 137 ng/Kg		R RR
	BHB	2.2 ng/Kg 26 ng/Kg		R RR
	NCB	1.8 ng/Kg 62 ng/Kg		R RR
	SD	2.7 ng/Kg 55 ng/Kg		R RR
	BL0317SD A102934#2	0.4 ng/Kg 1.2 ng/Kg	4 12	Blank
28835	CA	ND 52 pg/L		- R
	CBT	ND 11 pg/L		- R
	DA	ND 52 pg/l.		- R
	DJ	ND 24 pg/l.		- R
	IMB	ND 44 pg/L		- R
	ISB	ND 49 pg/L		- R
	KB	3.3 pg/l. 56 pg/L		- R
	PAB	ND 12 pg/L		- R
	RSB	ND 22 pg/L		- R
	BL0317WF A102941#2	ND 10 pg/L	100	Blank

SDG #	Sample/Blank	HPCDD OCCD Conc.	Blank Cutoff	Qualifier
28844	AB	1.5 ng/Kg 86 ng/Kg Plus		RR RR
	ADD	0.5 ng/Kg 6.0 ng/Kg Plus		RR R
	CD	2.3 ng/Kg 125 ng/Kg Plus		RR RR
	LB	1.7 ng/Kg 31 ng/Kg Plus		RR RR
	MR	0.9 ng/Kg 35 ng/Kg		RR RR
	PJD	3.1 ng/Kg 53 ng/Kg Plus		RR RR
	PJR	1.2 ng/Kg 45 ng/Kg Plus		RR RR
	SLB	1.8 ng/Kg 83 ng/Kg Plus		RR RR
	BL0317SD A102932#1	ND 1.1	 11	Blank
28844	EZM	6.5 pg/L 41 pg/L Plus		RR R
	NOV	9.4 pg/L 541 pg/L Plus		RR RR
	BL0317WF A102941#2	ND 10 pg/L	 100	Blank
28844	QAR-Reanalysis	85 pg/L 1407 pg/L Plus		* *
	BL0325WB (Blank) A102972#1	2.4 pg/L 6.4 pg/L	24 64	Blank
29081	TMSS	4.6 ng/Kg 546 ng/Kg		RR *

SDG #	Sample/Blank	HPCDD OCCD Conc.	Blank Cutoff	Qualifier
	A103029 #2 (Blank)	Could not Locate in Datapak		-

Attachment 1

Selected Pages of USEPA Document

DATA VALIDATION STANDARD OPERATING PROCEDURES FOR POLYCHLORINATED DIBENZODIOXIN AND POLYCHLORINATED DIBENZOFURANS ANALYSIS BY HIGH RESOLUTION GAS CHROMATOGRAPHY/ HIGH RESOLUTION MASS SPECTROMETRY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
SCIENCE AND ECOSYSTEM SUPPORT DIVISION
OFFICE OF QUALITY ASSURANCE
ATHENS, GEORGIA 30605-2720

SEPTEMBER 1996

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Environmental Scientist

Approved by: Gary Bennett
Region IV QAO

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VALIDATION DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the qualifiers assigned to results in the data validation process.

J The analyte was positively identified; the associated numerical value is the estimated concentration of the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

U Not detected above the Detection Limit (DL).

VII. METHOD BLANK ANALYSIS

A method blank should be extracted with each batch of samples. The matrix for the method blank should be similar to the associated samples.

Criteria:

1. The method blank should be analyzed on each DB-5 column instrument used to analyze the associated samples. In addition, a blank must be analyzed each 12-hour shift, after the analysis of the continuing calibration and prior to the analysis of the samples. This blank may be the associated method blank, a method blank associated with a different batch, or a system blank. The use of instrument blanks is acceptable for DB-225 column analyses.

2. Laboratory method blanks should not contain any 2,3,7,8-substituted PCDD/PCDF in amounts greater than the concentration of the lowest calibration standard. Non 2,3,7,8-substituted compounds or other potentially interfering compounds should not be present in amounts greater than the concentration of the lowest calibration standard, assuming a response factor of 1.

Action:

1. If the appropriate blanks were not analyzed with the frequency described above, then the data reviewer should use professional judgement to determine if the associated sample data should be qualified. The reviewer may need to obtain additional information from the laboratory.

2. If a target compound is found in a blank but not found in the sample, no action is taken. If the contaminants found are interfering non-target compounds at significant concentrations, then this should be noted in the report narrative.

3. Action in the case of blank contamination depends on the circumstances and origin of the blank. Qualification should be based upon comparison with the associated blank having the highest concentration of a contaminant. Associated blanks include the extraction method blanks, the 12-hour shift blank(s) and the Region IV blind blank. Field and equipment blanks are

not used for data qualification.

Any compound detected in the sample that was also detected in any associated blank is not reported if the sample concentration is less than ten times (10x) the blank concentration. Typically, the quantitation limit is raised to the concentration found in the sample.

If the compound is present in the sample in an amount less than the detection limit (DL), then the DL should be reported with the U flag. If the compound is present in the sample in an amount greater than the DL but less than 100, report the next highest amount, using one significant figure, with the U flag. If the compound is present in the sample in an amount greater than the DL and greater than 100, report the next highest amount, using two significant figures, with the U flag.

If use of the 10X rule causes elevated detection limits to be reported for any congeners, apply the "B" qualifier to these congeners. The B qualifier flag is to be applied to these congeners on the internal Form I only. The B qualifier is not to be reported on the final Data Report Sheet.

Additionally, there may be instances where little or no contamination was present in the associated blanks, but qualification of the sample was deemed necessary. Professional judgement should be used in these situations. An explanation of the rationale used for this determination should be provided in the review narrative.

4. If gross contamination exists (i.e., saturated peaks), all affected compounds in the associated samples should be considered to be unusable (R flag), due to interference. This is a contract issue and should be regarded as an action item.

5. If an instrument blank was not analyzed following a sample analysis which contained an analyte(s) at high concentration(s), sample analysis results after the high concentration sample must be evaluated for carryover. Professional judgement should be used to determine if instrument cross-contamination has affected any positive compound identification(s).

6. Blanks or samples run after a Region IV blind spike, matrix spike or standard should be carefully examined to determine the occurrence of instrument or syringe carry-over. Since the efficiency of sample transfer can vary dramatically according to apparatus and operator techniques, professional judgment should be used in each case to determine whether sample or blank results are attributable to carry-over. Professional judgement should be used to determine if blank results which are possible artifacts of carry-over should be used in determining contamination.

7. When there is convincing evidence that contamination is restricted to a particular instrument, matrix, or concentration level, professional judgement should be used to determine if the 10X rule should only be applied to compare contaminated blanks to certain associated samples (as opposed to all samples in the case).

Sample Information												
Code->	JABT-Re	JABB-Re	JABP-Re	NIAT-Re	NIAB	NIAP-Re	DMA	SLB+ POND	AB POND	LB+ POND	PJD	ADD
Sample Location->	North Boring	North Boring	North Boring	South Boring	South Boring	South Boring	SEEP	3	2	1	Sand Filter	Carbon Filter
Depth->	Top	Middle	Bottom	Top	Middle	Bottom						
Matrix->	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Carbon
Dioxins & Furans (ng/Kg)												
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDD	20.8	79 38	14 53	6.09	2 11	20 89	1 08	1 77	1 53	1 71	3.08	0.453
OCDD	788.85	1657 17	248.94	218 65	76 84	696 97	47 03	83 446	86 27	31 23	52 6	5.994
2,3,7,8-TCDF	-	27 41**	-	52 3	-	23 08**	-	-	-	-	-	-
1,2,3,7,8-PeCDF	-	14 72	-	18 94	-	-	-	-	-	-	-	-
2,3,4,7,8-PeCDF	11.01	29 88	-	59 56	-	26 02	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	153.47	166 51	26.21	623 16	1 06	366 42	-	-	-	-	0.28	-
1,2,3,6,7,8-HxCDF	28.53	24 77	-	52 47	0 37	49 1	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	33 1	-	-	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	41 11	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	165.99	189.71	25 19	597 78	1 02	444 67	-	0 358	0 3	0 5	0.92	0.516
1,2,3,4,7,8,9-HpCDF	90	52 51	10 33	428.65	-	199 95	-	-	-	-	-	-
OCDF	693 44	469 35	75 47	2894.22	2 29	1414 42	-	0.276	0 43	1 53	2.6	0.362
Comments	Reanalysis QC OK?	Reanalysis QC OK? **Did not confirm Surrogates out both analyses	Reanalysis QC OK?	Reanalysis QC OK?	QC OK?	Reanalysis QC OK? **Did not confirm	QC OK	QC OK?	QC OK?	QC OK?	QC OK?	QC OK?
PCBs (ug/g)												
Aroclor 1260	44 1	90 3	60.7	267 8	385 7	150 5	ND	ND	ND	ND	ND	ND
Comments	Bias Noted	Bias Noted	Bias Noted	Bias Noted	Bias Noted	Bias Noted						
Pests & Herbs (ug/g)							ND				ND	ND
BNA's (ug/Kg)							ND					
1,4-dichlorobenzene	-	-	-	1967	-	-	-					
Phenanthrene	-	-	1000	-	-	67	-					
Anthracene	-	-	467	-	-	-	-					
Fluoranthene	1067	9000	3233	-	-	1800	-					
Pyrene	800	6433	3467	-	-	1833	-					
Benz (a) anthracene	-	12333	6167	-	-	-	-					
Chrysene	-	6600	3800	-	-	-	-					
Benzo (b) fluoranthen	-	5833	1800	-	-	-	-					
Lab ID Number	970996	970997	970998	970999	971000	971001	971412				970967	970970
Comments	PCBs +	PCBs +	PCBs +	PCBs +	PCBs +	PCBs +						
											ND	ND
VOCs (ug/Kg)												
Lab ID Number											970972	970973
											ND	ND
Metals												
Barium (mg/Kg)							69				35	46
Chromium (mg/Kg)							9 8				-	-
TCLP Barium (mg/L)							0 86				0 56	0.34

Sample Information			
Code->	QAR+	EZM	NOV
Sample Location->	North Well (Inlet)	Outlet	South Well
Matrix->	Water	Water	Water
Dioxins & Furans (pg/L)			
2,3,7,8-TCDD	-	-	-
1,2,3,4,6,7,8-HpCDD	84.84	6.485	9.42
OCDD	1407.17	41.02	540.74
2,3,7,8-TCDF	-	-	-
1,2,3,7,8-PeCDF	-	-	-
2,3,4,7,8-PeCDF	-	-	3.72
1,2,3,4,7,8-HxCDF	68.21	-	75.21
1,2,3,6,7,8-HxCDF	-	-	11.74
1,2,3,7,8,9-HxCDF	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-
1,2,3,4,6,7,8-HpCDF	85.99	-	77.97
1,2,3,4,7,8,9-HpCDF	28.99	-	40.48
OCDF	264.53	3.55	387.68
Comments	Reanalysis	QC OK?	QC OK?
	QC OK?		
PCBs (mg/L)			
Aroclor 1260	0.006	ND	0.0006
Comments			
Pests & Herbs (mg/L)	ND	ND	ND
BNA's (ug/L)			
Lab ID Number	970978	970981	970077
1,4-Dichlorobenzene	ND	ND	26
VOCs (ug/L)			
Lab ID Number	970985	970083	970984
Acetone	46	3	8
2-Butanone	-	-	24
Chlorobenzene	-	-	30
1,4-Dichlorobenzene	-	-	21
		See comment	See comment
Metals			
Barium (mg/L)	0.28	0.03	0.28
Chromium (mg/L)	-	-	-
Lead	0.05	-	0.05

Sample Information																					
Code->	BB	JDH	ALB	RPAB	RBAB+	RPF	JDW	CEH	PSG	JOK	M&M	BT	CC	ADJ/JDA	RDRJ	RAJR	AJ	ASH	DRK OSW-2	RAM OSW4	*RPS OSW3
Sample Location->	MW-1	MW-1A	MW-2	MW-3A (D)	MW-3S	MW-4	MW-4A	MW-5S	MW-5D	MW-6	MW-7S	MW-7D	MW-8	MW-9	MW-10S	MW-10D	MW-11	MW-12	Aston-BG	O'Neal-BG	Davis-BG
Matrix->	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Dioxins & Furans (pg/L)																					
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	24.05**	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8-PeCDD	-	5.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	-	10.72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	-	34.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	-	27.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDD	6.77	1041.2	2.87	10.13	3.95	-	4.07	3.88	4.59	-	2.13	3.2	7.52	10.36	4.95	4.52	7.49	-	-	-	4.03
OCDD	47.69	10053.3	21.82	97.75	18.23	21.11	21.51	16.69	31.64	18.09	14.06	17.64	99.02	87.53	18.82	30.48	54.26	13.09	29.36	19.63	36.99
2,3,7,8-TCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	-	28.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	-	7.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	3.29	186.9	-	-	2.13	-	1.88	-	-	-	1.53	3.85	4.12	3.04	2	2.88	3.47	-	-	-	2.34
1,2,3,4,7,8,9-HpCDF	-	10.44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OCDF	4.35	626.83	-	6.38	-	-	-	-	-	-	-	-	7.74	5.65	-	-	-	-	-	-	-
Comments									** Reported as EMPC since all QC criteria for positive identification not met.												
									EMPC= Estimated Maximum Potential Concentration												
PCBs (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND/ND	ND	ND	ND	ND	ND	ND	?
Comments																				Sample labelled RAM	Could not locate
Pesticide/Herbs (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND/ND	ND	ND	ND	ND	ND	ND	?
BNA's (ug/L)																					
Lab ID Number	971387	971399	971391	971393	971395	971397	971399	971401	971403	971405	971406	971407	971404	971402	971408	971398	971396	971394	971392	971390	?
	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	971400	ND	ND	ND	ND	ND	ND	?
Comment	TIC		TIC			TIC			TIC			TIC		ND/ND					TIC		
VOCs (ug/L)																					
Lab ID Number	971443	971445	971447	971449	971451	971453	971455	971457	971459	971461	971462	971463	971460	971458	971464	971454	971452	971450	971448	971446	
	ND	ND	ND	ND	ND	ND	ND	ND	ND	Data	Data	ND	ND	971456	ND	ND	ND	ND	ND	ND	
Comment	Low Level of Acetone in some of the samples							TIC		Incomplete	Incomplete			ND/ND							
Metals																					
Barium (mg/L)	0.06	0.07	0.06	0.09	0.06	0.06	0.04	0.1	0.11	0.06	0.09	0.06	0.06	0.06	0.05	0.03	0.08		0.07	0.07	
Chromium (mg/L)	-	0.01	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-		-	-	

Sample Information									
Code->	ADF	MB	JEN	CBT	KTB	TB	CAN	AW	JD
Sample Location->	Blank	Blank	Trip Blank	Blank	Blank	Blank	Trip Blank	Blank	Blank
Comments	Equip. Rinsate	Drilling Water	Day One	Equip. Rinsate	Soil Equip. Rinsate	Sub-Pump Rinse	One-Shipment 4/9	Sub-Pump Rinse	Bailer Sampling Blank
Matrix->	Water	Water	Water	Water	Water	Water	Water	Water	Water
Dioxins & Furans (pg/L)									
2,3,7,8-TCDD	-	-	-		-	-		-	-
1,2,3,7,8-PeCDD	-	-	-		-	-		-	-
1,2,3,4,7,8-HxCDD	-	-	-		-	-		-	-
1,2,3,6,7,8-HxCDD	-	-	-		-	-		-	-
1,2,3,7,8,9-HxCDD	-	-	-		-	-		-	-
1,2,3,4,6,7,8-HpCDD	3.05	6.13	-		4.82	11.37		18.57	4.52
OCDD	20.43	39.62	10.7		25.56	357.64		150.06	41.69
2,3,7,8-TCDF	-	-	-		-	-		-	-
1,2,3,7,8-PeCDF	-	-	-		-	-		-	-
2,3,4,7,8-PeCDF	-	-	-		-	-		-	-
1,2,3,4,7,8-HxCDF	-	-	-		-	-		-	-
1,2,3,6,7,8-HxCDF	-	-	-		-	-		-	-
1,2,3,7,8,9-HxCDF	-	-	-		-	-		-	-
2,3,4,6,7,8-HxCDF	-	-	-		-	-		-	-
1,2,3,4,6,7,8-HpCDF	1.9	-	-		2.48	2.89		5.77	-
1,2,3,4,7,8,9-HpCDF	-	-	-		-	-		-	-
OCDF	-	-	-		2.46	30.91		9.05	-
Comments									
PCBs (mg/L)	ND	ND		ND	ND	ND		ND	ND
Comments									
Pests (mg/L)		ND			ND	ND	ND	ND	ND
Herbs (mg/L)		ND			ND	ND		ND	ND
BNA's (ug/L)		ND			ND	ND		ND	ND
Lab ID Number		970994			971383	971384		971385	971386
Comment									
VOCs (ug/L)			ND		ND				ND
Toluene		97	-		-	-		-	-
Xylenes		12	-		-	-		-	-
Acetone		97	-		-	23		79	-
2-Butanone		43	-		-	-		7	-
Lab ID Number		970995	970884		971439	971440	971465	971441	971442
Comment									
Metals									
Barium (mg/L)		0.05			0.02	-		0.04	-
Chromium (mg/L)		-			-	-		-	-

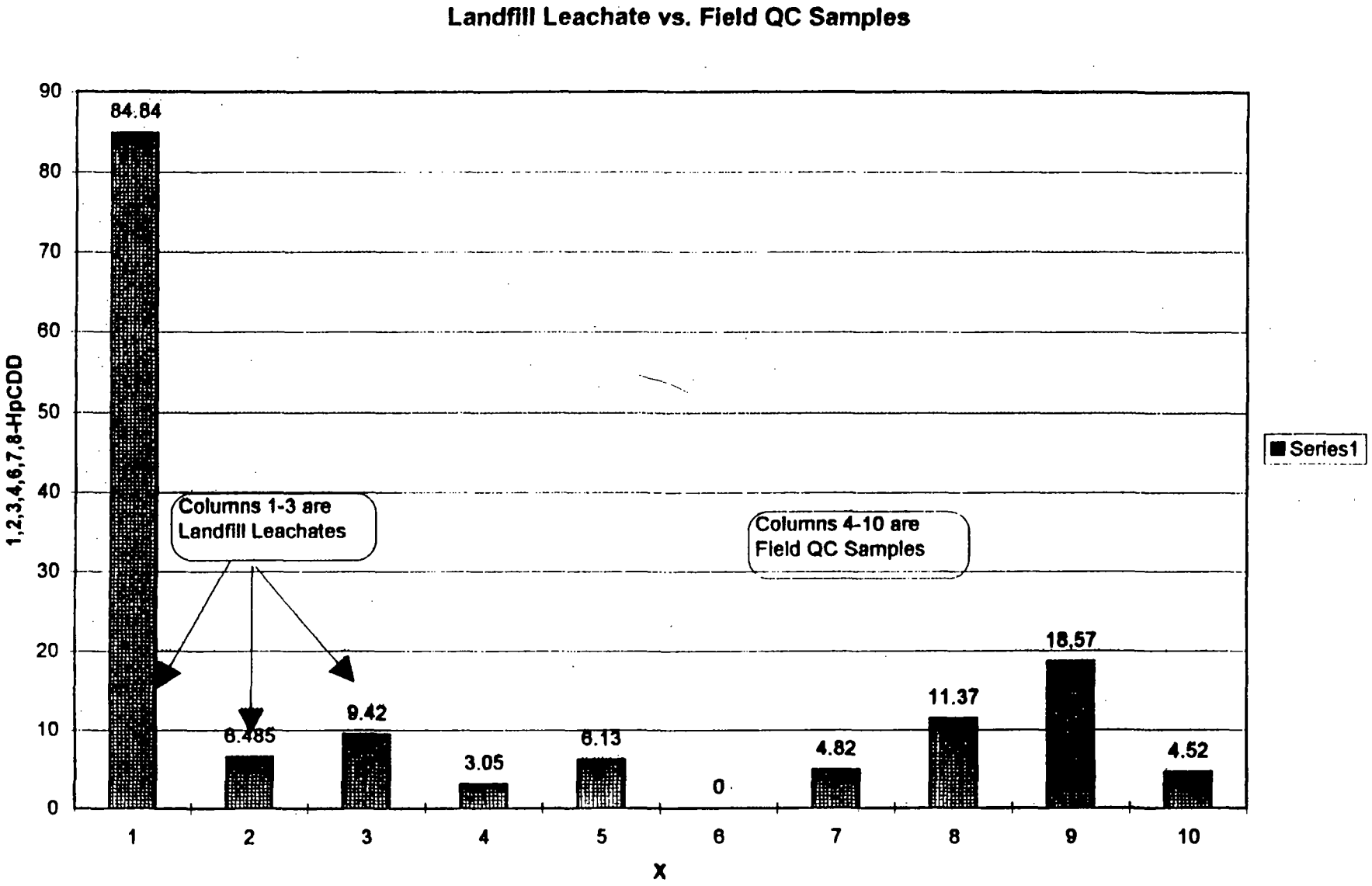
Sample Information									
Code->	BHB	CB	MS	MR	AR+	NCB	SD	PJR	CD
Sample Location->	Sed. 1	Sed 2	Sed. 3	Sed. 4	Sed. 5	Sed. 6	Sed. 7	RCUS	RCUS
Comment	Near 1st Occurrence South			Confluence				Above Bridge	Below Bridge
Matrix->	Soil/Sed.	Soil/Sed.	Soil/Sed.	Sed.	Sed.	Sed.	Sed.	Sed.	Sed.
Dioxins & Furans (ng/Kg)									
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	-
1,2,3,7,8-PeCDD	-	-	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	-	-	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	-	-	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	-	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDD	2.22	2.35	1.36	0.92	2.73	1.81	2.65	1.2	2.29
OCDD	26.34	125.4	69.56	34.95	137.46	62.33	54.51	45.26	124.56
2,3,7,8-TCDF	-								
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-	-	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	-	0.42	0.27	-	-	0.23	0.43	0.24	0.28
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-	-	-
OCDF	-	-	-	-	-	-	0.55	-	-
Comments									
PCBs (ug/g)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Comments									

Sample Information					
Code->	BJ	RB	SB	MBR	BR
Sample Location->	SurS-1	SurS-2	SurS-3	SurS-4	SurS-5
Matrix->	Soil	Soil	Soil	Soil	Soil
PCBs (ug/g)	ND	ND	ND	ND	ND

Sample Information			
Code->	TMSS	LESS	HESS
Sample Location->	OSW-3	OSW-2	OSW-4
Matrix->	Surface Soil	Surface Soil	Surface Soil
Dioxins & Furans (ng/Kg)			
2,3,7,8-TCDD	-	-	-
1,2,3,4,6,7,8-HpCDD	4.59	1.66	2.16
OCDD	546.1	244.9	432.6
2,3,7,8-TCDF	-	-	-
1,2,3,7,8-PeCDF	-	-	-
2,3,4,7,8-PeCDF	-	-	-
1,2,3,4,7,8-HxCDF	-	-	-
1,2,3,6,7,8-HxCDF	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-
1,2,3,4,6,7,8-HpCDF	-	-	-
1,2,3,4,7,8,9-HpCDF	-	-	-
OCDF	-	-	-
Comments			
PCBs (ug/g)	ND	ND	ND
Aroclor 1260	-	-	-
Comments			
Pests & Herbs (ug/g)	ND	ND	ND
BNA's (ug/Kg)	ND	ND	ND
Lab ID Number	971409	971410	971411
Metals			
Barium (mg/Kg)	86	33	37
Chromium (mg/Kg)	22	20	20
Lead (mg/Kg)	20	-	9.8
TCLP Barium (mg/L)	0.63	0.75	0.72

Sample Information							
Code->	RSB	KB	IMB	ISB	DA	CA	DJ+
Sample Location->	SW-1	UTDS	UTUS	RCDS	RCUS	RCUS	SW-2
Comment	Due South of MW-6				Above	Below	
Matrix->	Water	Water	Water	Water	Water	Water	Water
Dioxins & Furans (pg/L)							
2,3,7,8-TCDD	-	-	-	-	-	-	-
1,2,3,7,8-PeCDD	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDD	-	3.31	-	-	-	-	-
OCDD	22.3	56.33	43.8	49.04	51.75	51.95	24.14
2,3,7,8-TCDF	-	-	-	-	-	-	-
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	-	-
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-
OCDF	-	-	-	-	-	-	-
Comments							
PCBs (mg/L)	ND	ND	ND	ND	ND	ND	ND
Comments							

Sample Information									
Code->	PMB	HM	WM	KM	DM	MM	TM OSW-3	LE OSW-2	HE OSW-4
Sample Location->	Davis-BG	MW-7	MW-11	MW-1	MW-12	MW-5	Davis-BG	Alston-BG	O'Neal-BG
Comment	@ Water Table	@ Water Table	@ Water Table	@ Water Table	@ Water Table	@ Water Table	@ Water Table	@ Water Table	@ Water Table
Matrix->	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dioxins & Furans (ng/Kg)									
2,3,7,8-TCDD	-	-	-	-	-	-			
1,2,3,4,6,7,8-HpCDD	0.57	-	0.3	-	-	-			
OCDD	24.15	1.8	1.02	1.39	2.65	2.64			
2,3,7,8-TCDF	-	-	-	-	-	-			
1,2,3,7,8-PeCDF	-	-	-	-	-	-			
2,3,4,7,8-PeCDF	-	-	-	-	-	-			
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-			
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-			
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-			
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-			
1,2,3,4,6,7,8-HpCDF	0.19	-	0.24	0.22	-	-			
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-			
OCDF	-	-	-	0.25	-	-			
Comments							No Data Found	No Data Found	No Data Found
PCBs (ug/g)	ND	ND	ND	ND	ND	ND			
Aroclor 1260									
Comments									
Pests & Herbs (ug/g)		ND	ND	ND	ND	ND			
BNA's (ug/Kg)		ND	ND	ND	ND	ND			
Lab ID Number		970986	97089	970987	970988	970992			
Metals									
Barium (mg/Kg)		240	150	250	170	130			
Chromium (mg/Kg)		20	22	18	-	-			
Lead (mg/Kg)		-	-	-	-	-			
TCLP Barium (mg/L)		1.63	1.88	1.39	1.46	1.3			


Landfill Leachate vs. Field QC Samples
1,2,3,4,6,7,8-HpCDD
X
Series1
Columns 1-3 are Landfill Leachates
Columns 4-10 are Field QC Samples
84.84
6.485
9.42
3.05
6.13
0
4.82
11.37
18.57
4.52
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10

	Landfill Leachates			Field QA/QC Samples						
Dioxins & Furans (pg/L)										
1,2,3,4,6,7,8-HpCDD	84.84	6.485	9.42	3.05	6.13	-	4.82	11.37	18.57	4.52
OCDD	1407.17	41.02	540.74	20.43	39.62	10.7	25.56	357.64	150.06	41.69
2,3,4,7,8-PeCDF	-	-	3.72							
1,2,3,4,7,8-HxCDF	68.21	-	75.21							
1,2,3,6,7,8-HxCDF	-	-	11.74							
1,2,3,4,6,7,8-HpCDF	65.99	-	77.97	1.9	-	-	2.48	2.89	5.77	-
1,2,3,4,7,8,9-HpCDF	28.99	-	40.48							
OCDF	264.53	3.55	387.68	-	-	-	2.46	30.91	9.05	-
PCBs (mg/L)										
Aroclor 1260	0.006	ND	0.0006							
1,4-Dichlorobenzene	ND	ND	26							
VOCs (ug/L)										
Acetone	46	3	8		97	-	-	23	79	-
2-Butanone	-	-	24	-		7				
Chlorobenzene	-	-	30							
1,4-Dichlorobenzene	-	-	21							
Toluene					97	-	-	-	-	-
Xylenes					12	-	-	-	-	-